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The Creative Apparel Design Process: a Personal Documentation and Proposed Conceptual Model

by

Pamela Maryann Bailey

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Arts

in

Textiles and Clothing

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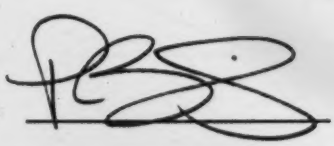

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled **The Creative Apparel Design Process: a Personal Documentation and Proposed Conceptual Model** submitted by **Pamela Maryann Bailey** in partial fulfillment of the requirements for the degree of **Master of Arts** in Textiles and Clothing.

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ABSTRACT

The focus of this study was to chronicle the development of a line of clothing and to propose a conceptual model of the creative apparel design process. Published conceptual models of the creative thinking process and the apparel design process were reviewed, summarized and evaluated. The formal study documented the creation of a line of garments through sketch development and reflection-in-action. This process culminated in the design and production of nine "mix-and-match" garments based on the trigger mechanism, outdoor sculpture.

Following the documentation of the creative apparel design process a conceptual model was developed. Unlike previous conceptual models, the resulting model accounts for creative thinking, design process elements and continuous evaluation. The important aspects of the model include the individuality of the thinker/designer, the dynamic nature of the process, the role of multiple modes of thought processes, and the influence of external stimuli on the thinker/designer.

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Chapter 1

Introduction

A written account of the design process as experienced by apparel designers is elusive. This may be due to the engrossing nature of the process itself, so that writing about it is redundant. Perhaps, it is due to the challenging and instinctive nature of the process making it difficult to put the experiences into words. Or, perhaps, the outcome of the design process is enough evidence of the documentation, when meanings cannot be captured by the limitations of text. Whatever the reasoning, there is a lack of documentation of the designer's experiences during the creative design process.

Traditionally creativity and design have been viewed in a similar manner. Both have been reduced to their most basic processes and placed into sequential stages. The outcome or product is used as an evaluative mechanism to gauge success. In both processes the influence and control of the individual is overlooked. More recently, the individuality of the creator on the processes is beginning to be acknowledged in the literature and this has led to new ways of envisioning how a designer interacts within the creative design process. However, this acknowledgement of the individual nature of the creator presents new challenges to creative design research. It becomes extremely difficult to make generalised conclusions when individuals experience the creative process in unique ways. Yet, the awareness of the evolution of a personal process may, in turn, shed light on a new way of thinking and teaching creative apparel design.

Statement of the Problem

Individuality and personality are evident in designers' creations, however, this individuality also exists within the process of creating the designed object. It is the unique and individualistic qualities of the design process that makes it so difficult to formalize a conceptual framework for the creative design process.

Design is the process or model that is developed initiating an idea for an object before it has tactile form (Archer, 1984). The designer is the individual who encounters the process of design from the idea inception through to the formation of a prototype. Design literature focuses on the dissection of the process into understandable, rationalized stages of evolution, while ignoring the individualistic nature of the designer's personal design process. Researchers in this field acknowledge the lack of generalised

evidence for the personal design process due to the individualistic and intuitive nature of the process itself (Fiore, Kimle, Moreno, 1996; Lamb & Kallal, 1992; Jones, 1980). Due to the focus on stages of design there is a lack of research conducted on the involvement and influence of the designer's creative process on the design process. These two processes are not only parallel, but highly interdependent.

Creativity is the ability to formulate an idea which challenges and heightens the creator's mind (Boden, 1992). According to this definition creativity is a trait possessed by individuals and is not exclusive to artistic fields. The concept of creativity is even more vague than that of design because of the highly intuitive and subconscious elements in its development. However, the stimulation of creativity can be triggered and this area of creativity has been researched at length (Jones, 1980). Creativity can be triggered by lateral thinking exercises which includes brainstorming. It is the triggering of ideas which begins the process of design. Idea inception or trigger mechanism is the point at which the creative apparel design process begins.

The literature reviewed on design process, apparel or otherwise, focuses on formulating a two dimensional conceptual model for the stages of design (Orlando-DeJonge, 1984; Lamb & Kallal, 1992). This generalization may be helpful for initial visualization of the process, but due to its two dimensional nature, it lacks an inherent element, the involvement and individuality of the designer. The lack of literature on designers' experiences during the creative apparel design process motivates the exploration and documentation of the evolution of my personal design process. This process is also an effort to awaken the consciousness of individual design processes and increase effectiveness for arriving at design solutions.

The exploration involves a literature search on different types of design processes, as well as, information on creativity, its sources and processes. The formal study centred on the creation of a line of garments, from conception to construction. This process was documented using a sketchbook/scrapbook in which ideas were initiated, discussed and evaluated. The construction process of the garments was also documented in the sketchbook/scrapbook. The documentation contained initial ideas, sketches, sources of inspiration, evaluation, reflective comments and the final designed objects.

Significance of the Study

A documented study on the design process, as experienced by the designer, will

contribute to the body of knowledge in this field. Belief in the design process as occurring magically without progress or evolution, supports the continuation of misinformation regarding how an idea takes form. Information on the actions and choices of the designer during the apparel design process will help other designers and interested parties to relate to and reflect on the stages of design. Awareness and understanding of the processes of design will assist designers in the stimulation of their creativity (Dorst & Dijkhuis, 1995).

A greater understanding of how a designer creates will contribute to the way in which designers are taught. Current curriculum for apparel designers focuses on the dissection of the design process into logical, easily explainable steps which contribute to the outcome of the designed object. This way of teaching focuses on technique and product and not the process of learning and development that occurs within the designer through exploration of the design process (Bakgaard, 1995). Teaching design in this manner lacks the necessary theoretical background to explain the process of creative design and the vital role the designer plays within the process. The topics covered in current apparel design process literature provide a general background to understanding the design process. But, due to the focus on product, not process, it hampers the development of new, challenging ways of teaching apparel design. By incorporating the exploration of a designer's creativity and challenging a student to expand their creativity, the personal design process will be a more effective learning tool for apparel design.

Purpose and Objectives

The purpose of this investigation was to explore the design process using a reflection-in-action concept to document the creative process in the design of a line of apparel. Specifically, the objectives of this study are:

1. To explore the theories relating to the design process;
2. To document the creative design process for the development of a line of garments;
3. To utilize a variety of external stimuli, as trigger mechanisms, in the creative apparel design process;
4. To apply elements from a constructionist paradigm (reflection-in-action) to the design and the production of a line of garments suitable for exhibition;
5. To contribute to the dialogue about the creative apparel design process; and
6. To propose a conceptual model for the creative apparel design process.

Parameters for the Study

The creative design process is an engrossing phenomenon for the designer. This makes it difficult to limit the process as it is integral to a designer's life. Therefore, to suggest that a study, which deals with the design process, should have limitations placed upon it, is self defeating. However, the purpose of imposing parameters for this study is not to confine the creativity of the process, but to keep it manageable and allow for reflection and evaluation as an integral part of the process. These parameters are self imposed to make this study manageable even though the process and the knowledge gained from the study will remain a life-long influence.

Parameters for this project focused on flexible versus fixed variables. Flexible variables were creative processes versus the fixed variables which were processes established to control the length of this documentation process. Flexible variables allow for expression of the design process through multiple forms of media and communication. These may include the use of sketching, painting, collecting images (photos, etc.), using computer programs (AutoCAD®, Photoshop®) and other materials appropriate to the expression of the development of a creative design. Fixed variables included the number of pieces taken to tactile form (less than ten) and the use of the Clothing and Textiles Collection for inspiration or for reference of production techniques.

Definitions

For clarification purposes, the following terms, which are used in this study, will be defined as outlined:

constructivism: "a paradigm which emphasizes that what is real cannot be assessed objectively but only through the constructs of the observer, and reflexivity, which emphasizes that the observer is part of the system being observed" (Doherty & Baptiste, 1993, p. 511).

creative thinking process: "a multi-faceted phenomenon which results in the production of new and useful ideas" (Isaksen, Puccio & Treffinger, 1993, p.149).

creativity: "the ability to come up with an idea which, relative to the pre-existing domain-space in one's mind, one could not have had before" (Boden, 1992, p. 216).

design: "the formulation of a prescription or model for a finished work in advance of its embodiment" (Archer, 1984, p. 58).

design process: "the translation of information in the form of requirements, constraints,

and experience into potential solutions which are considered by the designer to meet required performance characteristics" (Luckman, 1984, p. 84).

double loop learning: "referring to the capacity of individuals to reflect on and amend not only their action strategies, but also govern variables behind those strategies" (Reason, 1994, p. 330).

environment: "consists of the totality of the physical, biological, social, economic, political, aesthetic, and structural surroundings for human beings and the context for their behavior and development" (Bubolz & Sontag, 1993, p. 432).

experiential knowledge: "knowledge gained through direct encounter face-to-face with persons, places or things [environment]" (Reason, 1994, p. 326).

intellectual and intuitive modes of thought: "The two internal processes of the mind...seeing them as contrasting forces in the operation of consciousness: intuition in the very direction of life, and intellect going in the reverse direction concerned with the movement of matter. Separately they reflect different complimentary aspects of the human experience and together give a complete idea of the world" (Udall, 1996, p. 40) [For the purposes of this thesis intellectual thought refers to conscious thought and intuitive thought refers to subconscious thought]

paradigm: "an interpretive perspective" (Denzin & Lincoln, 1994, p. 199).

participative inquiry: "This world view sees human beings as co-creating their reality through participation: through their experience, their imagination and intuition, their thinking and their action" (Reason, 1994, p. 324).

Chapter 2
Literature Review

The literature review is presented to create a frame of reference and context for the reader in relation to creativity and apparel design. The literature gathered for this study focuses on three inter-related areas: creativity, the creative process and the design process. Much of the available literature is borrowed from other related fields including; psychology, industrial design and architecture, and is interpreted for its application to apparel design.

Creativity

Creativity is used as a descriptive term as though there is general agreement about what it is. Yet, a concrete definition for creativity remains a point of contention amongst researchers (Ebert, 1994). Part of the confusion surrounding the definition of creativity results from the way in which the word is used, as meanings differ according to whether they are referring to potential, activities or products (Gilchrist, 1972). Creativity is so difficult to encapsulate because it is so vast. "It involves every sense - sight, smell, hearing, feeling, taste, and even perhaps the extrasensory. Much of it is unseen, nonverbal, and unconscious"(Torrance, 1988, p. 43)). Yet, despite the difficulty in encapsulating creativity into a precise definition many researchers have successfully defined some of the subcategories of creativity; these include trait, cognition and process.

Artistic definitions

Torrance (1988) describes creativity as being beyond the textual world. Yet, in terms of research, a definition is necessary for complete understanding. Therefore, he has found 'artistic' definitions to be helpful, especially for "...generating hypotheses, suggesting ideas, theorizing, organizing my thinking, and communicating the nature of creativity"(Torrance, 1988, p.49). Figures 1.1 to 1.3 illustrate some of these 'artistic' definitions that are to be interpreted as analogies. These figures represent how an individual can relate to the statement and illustration and interpret them for personalized meaning. Unlike other definitions, these 'artistic' definitions directly involve the viewer or thinker and allow for individual interpretations of the concept.

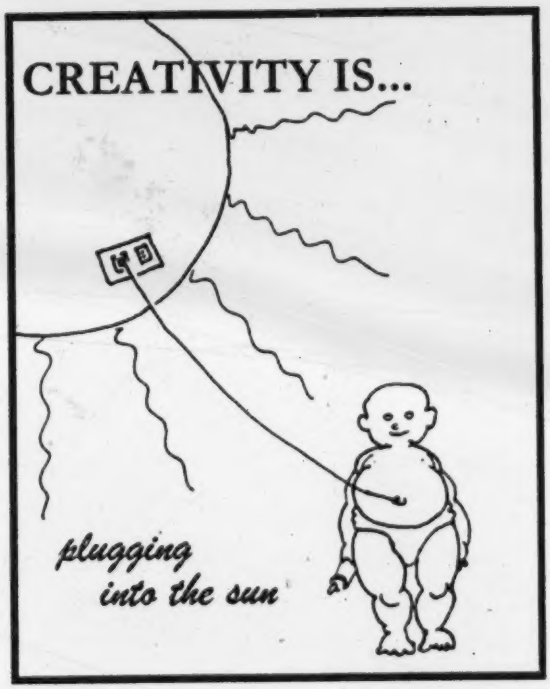

Figure 1.1.

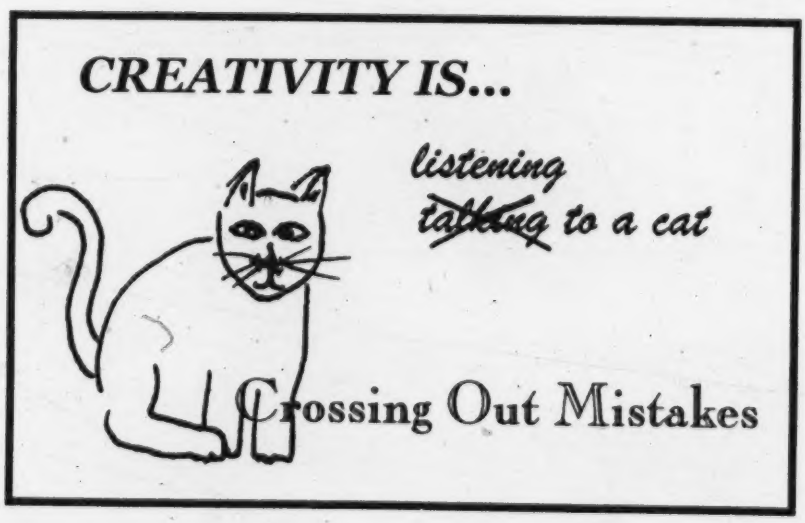

Figure 1.2.

Figure 1.3.

Figures 1.1-1.3. Artistic definitions help to clarify and illustrate the complexity and multiple levels of meaning of the term creativity. Note. Adapted from "The nature of creativity as manifest in its testing," P. E. Torrance, 1988. In Sternberg, R. J. (Ed.). The Nature of Creativity: Contemporary Psychological Perspectives, pp. 49-55. New York: Cambridge University Press.

The creative person

The term creativity is often used to describe an individual who possesses characteristics deemed 'creative'. Often the use of the term is interchangeable with, and more aptly described by, the word talent. Talent means an innate ability to do something well (Csikszentmihalyi, 1996). A more apt trait description of a creative person is "the ability to come up with an idea which, relative to the pre-existing domain-space in one's mind, one could not have had before"(Boden, 1992, p.216). The importance of this definition is that to be deemed 'creative' the idea only has to be novel to the thinker, not necessarily to the whole of society (Torrance, 1988). Csikszentmihalyi (1996) describes the creative individual as being remarkably adaptable. They are able to adjust to almost any situation and use whatever tools are available to reach their goals.

Creative thinking and the cognitive spiral

Like creativity, creative thinking lacks a generally agreed upon concise definition. Despite the lack of agreement regarding the definition, it is agreed that creative thinking is a process (Ebert, 1994). This concept leads to two major areas of concern. Firstly, that traditionally creative thinking is measured based on the outcome of the process, the product. Secondly, is the process of creative thinking a specialized way of thinking or part of basic cognitive activity (Ebert, 1994)?

By viewing creative thinking in terms of its outcomes, an evaluative measurement is placed on the cognitive activity. This measurement does not take into account the overall process, but focuses the product on the bottom line, the creative product (Ebert, 1994). This context of viewing creative thinking isolates the creator, rather than viewing creative thinking in terms of where it occurs, within the individual. The creative product resulting from the process cannot arise on its own, as it comes from the processes of an individual (Ebert, 1994). It is the individual who creates and places the process of creative thinking in context.

The perspective of creative thinking as a process contained within an individual, leads to the discussion of whether creative thinking is a specialized form of cognitive activity or whether it is an integral part of cognitive processing as a whole. Ebert (1994) discusses the concept of creative thinking as part of general thought processing in his paper "The Cognitive Spiral: creative thinking and cognitive processing". In this paper he reviews multiple perspectives on creative thinking and cognitive processes. The views presented range from isolated processes to integrated models of creative thought and

these perspectives arise from the type of definition of creative thinking one employs. These definitions span a wide range from "thought to bare on an ill-defined problem" (Newell & Simon in Ebert, 1994, p. 278) to

> There is reason to think that much of the creative process is intuitive in nature and that it entails a work of the mind prior to its arising to the conscious level and certainly also prior to its being in expressible form. It is most likely pre-conscious, non-verbal or pre-verbal, and it may involve a large sweeping, scanning, deep, diffused, free and powerful action of almost the whole mind" (Taylor in Ebert, 1994, p. 280).

As definitions continue to evolve, researchers continue to synthesize a generally acceptable definition of creative thinking, incorporating the view that it is intertwined with basic cognitive processing (Ebert, 1994). Therefore, adopting a concept that creative thinking is part of general cognitive activity may be a more descriptive way of explaining the process of creative thinking in all fields, even those which are not considered to be creative.

A model was developed to help describe how creative thought is part of basic cognitive processing. Figure 2 illustrates the Cognitive Spiral Model developed to show how and where creative thought occurs during the continuum of cognitive processing (Ebert, 1994). This model was developed based on previous information-processing models that subscribe to the view that information flows through cognitive activity in a sequential nature and that the brain is a problem-solving system (Ebert). The Cognitive Spiral has five components that occur in sequence and 'spiral' to represent the growth of an individual's knowledge base. The components are: perceptual thought, creative thought, inventive thought, metacognitive thought and performance thought.

In the context of this model "perceptual thought" refers to the detection and transference of stimuli, either external or internal, through sensory organs. This process does not have an evaluative process, it simple gathers information and transfers it to the creative thought stage. In the "creative thought" stage, the stimulus is compared to the individual's knowledge base and interpreted to find patterns or relationships between what is known and the stimuli. This is a searching process and incorporates problem solving skills to find the necessary patterns for understanding. Like the "perceptual thought" stage, "creative thinking" does not have an evaluative mechanism and may operate at a pre-conscious level (Ebert, 1994). The creative thought does not stop once it has found a solution to the stimuli, but it also does not proceed from exactly the same

point, because the new solution becomes part of the knowledge base from which it will generate more solutions. The next stage is "inventive thought" which assembles the products of the previous two stages and deals with possibilities that have arisen. After "inventive thought" has assembled a product "metacognitive thought" evaluates the product as a possible solution. This stage uses an evaluative mechanism in which the individual is "thinking about one's thinking" (Ebert, 1994, p. 287). "Metacognitive thought" determines the suitability of the solution and the expression of this suitability of the product is found in the "performance thought" stage. "Performance thought" is the result of the whole process and is expressed through behavior as the stimulus and its possible solution is either acted on or not. The cognitive product will either yield a suitable product or it will be used as a new stimulus and the process will begin again. Because of what was learned during the cognitive process the new stimulus provides a developed knowledge base, therefore, the process does not revert to its initial starting point. It is the new starting point which leads to a spiralling process, not a cyclical process, because the stimulus has been altered (Ebert, 1994).

The creative thinking process

Although a specific definition about what creativity is has not been agreed upon, the context for describing creative behaviour has led to generalised theories and concepts (Ebert, 1994). In this case, it is not a term that describes a type of category or person, rather it is a multi-dimensional phenomenon that produces new and useful ideas (Isaksen, Puccio & Treffinger, 1993). Creativity is a cognitive process from which theories and concepts of how it occurs has and continues to evolve in the representation of various perspectives (Udall, 1996). Figure 3 illustrates a linear model developed by Getzels in 1980, this model is based on one of the earliest concepts of creativity described by the German physiologist, Herman Hemholtz (Udall). Hemholtz's three stage model of saturation, incubation and illumination was used to inspire Getzels' five-stage model of creativity. Getzels' five-stage model of the creative thinking process is an example of a model designed to illustrate the process as a form of specialized thought (Udall, 1996). Getzels describes the five stages of creativity to be: first insight, saturation, incubation, illumination and verification (figure 3). This model can be utilized from a design perspective to describe how an idea is developed. At the "first insight" stage the designer may be aware that there is a problem to be solved. During the

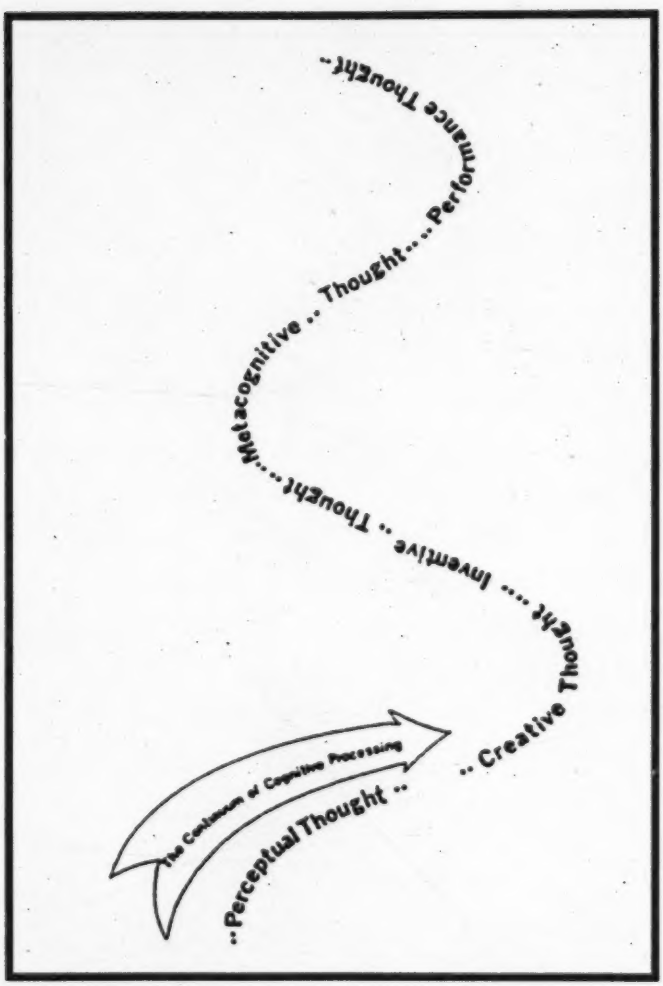

Figure 2. The Cognitive Spiral Model illustrates the five components of thought processes and their sequential nature. Note. Adapted from "The Cognitive Spiral: creative thinking and cognitive processing," by E. S. Ebert, 1994, The Journal of Creative Behaviour, 28(4), p. 283.

"saturation" and "incubation" stages designers may not even be aware that they are processing information on the problem to be solved as it is sub-conscious mental activity which generates solutions (Sapp, 1992). When the designer moves into the next stage, "illumination", the point of creative breakthrough occurs which is often deemed as insight and the idea is moved into conscious thought. The final stage, "verification" is where the idea is mentally checked as a possible solution to the problem (Udall, 1996). Although this model describes all the stages a designer encounters during a creative moment, it reduces the process to its most basic level in an attempt to predict a generalised outcome (Isaksen, Puccio & Treffinger, 1993). Therefore, Getzels' five-stage model does not account for the multi-levelled and dynamic nature of the individual encountering the creative thinking process (Udall, 1996).

Creativity is an internal process which draws upon levels of intelligence and intuition of the individual (Udall, 1996). According to Udall the dualism of intelligence and intuition inspired philosophers to view them as opposing forces of consciousness "separately they reflect different complimentary aspects of the human experience and together give a complete idea of the world"(p.40). The incorporation of these two aspects of consciousness casts a more complete picture on creativity. Due to the cyclical nature of this model, it represents a greater amount of the continuous development and interplay of an idea within the creative process. Figure 4 represents Getzels' model redrawn into a circle with the stages divided into either the intellectual or intuitive domain.

According to the cyclical five-stage model, "first insight" is the initial shift from the intuitive to the intelligence domain, as the creator first becomes aware of a problem that needs to be solved. Then, as the idea undergoes "incubation", it remains in the intuition realm where the mind continues to dwell and deal with the problem. During the illumination stage, the idea emerges out of intuition into conscious thought through a creative break through, at this point, the idea undergoes "verification" which is an evaluative mechanism preformed at an intellectual level (Udall, 1996). Despite the acknowledgement of multi-levels of thought within the creator, this model still seems lacking when describing such a dynamic, individualistic process.

To account for the integral dynamism of creativity and to describe the creative thinking process more effectively, a three-dimensional model, based on the Möbuis Ring, was developed by Udall (1996). Figure 5 illustrates this three-dimensional model which can be constructed from a rectangular strip of paper, with a half-twist in one end, and then taping the ends together to form a ring. The twist in the paper represents the "living

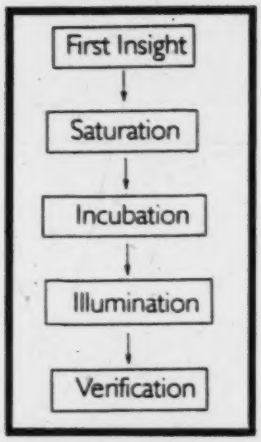

Figure 3. Getzels' five stage model of creativity. A linear model which illustrates the birth of an idea from its inception to its acknowledgement by the designer. Note. Adapted from "Creative transformation: a design perspective," N. Udall, 1996, The Journal of Creative Behaviour, 26(1), p. 40.

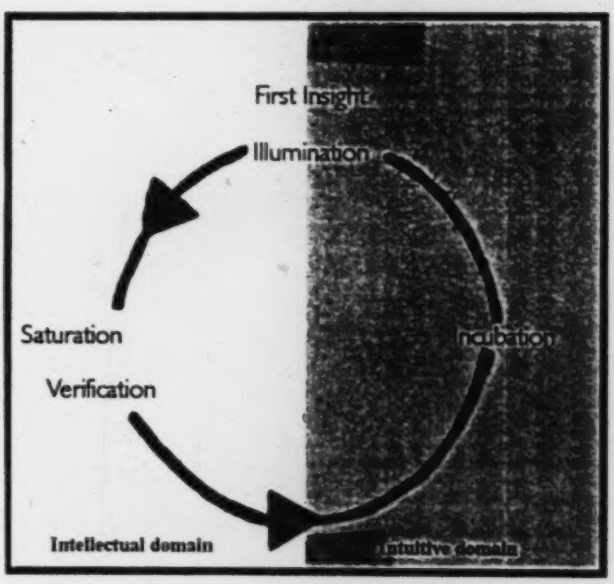

Figure 4. The cyclical model of Getzels' five stages illustrated with the realms of intelligence and intuition. Note. Adapted from "Creative transformation: a design perspective," N. Udall, 1996, The Journal of Creative Behaviour, 26(1), p. 41.

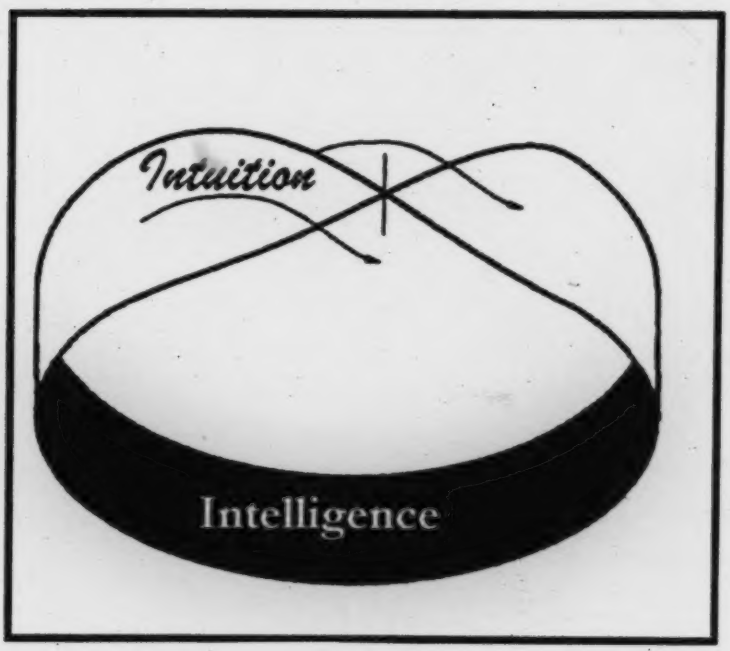

Figure 5. The Möbius Ring illustrates the separate, yet highly interdependent nature of intelligence and intuition within the creative process. Note. Adapted from "Creative transformation: a design perspective," N. Udall, 1996, The Journal of Creative Behaviour, 26(1), 42.

paradox where the inside and outside are one and the same thing" (Udall, 1996, p. 41). This ring illustrates how two essentially different cognitive elements, intelligence and intuition, are separated yet highly interconnected. Each side of the strip represents one of the cognitive elements, the twist or flip in the ring represents the gateway between these two modes of thought and the three-dimensional cycle represents the "dynamics of creativity" (Udall, 1996, p. 42).

The Möbius Ring illustrates the creative thinking process through the super-imposition of Getzels' five-stage model. The first stage, "first insight", occurs as the creator moves out of intuition into the intelligence side by identifying a problem. This leads to the intellectual stage of "saturation" where the mind prepares to tackle the problem. At the next stage, "incubation", the twist is reached again and intuition is used at a sub-conscious level. The next stage, "illumination", or the birth of the creative idea, the twist is approached for a third time and the creative leap of insight takes place. Finally, at the last stage, "verification", the creative idea is intellectually evaluated and the cycle can begin again (Udall, 1996). The use of the Möbius Ring illustrates the creative thinking process in a way in which the dynamism of the process is kept intact and the nature of the creative breakthrough is easily visualized.

Creative process

For some individuals the creative process is internal and centres on the thoughts and feelings which a designer or artist evokes as their idea evolves into its completed form. Unfortunately, as the process is internal, it is often difficult to analyse the stages of the process as it takes shape in the mind of the creator. Researchers have approached this difficulty in a variety of ways.

According to Andrews (1975) the creative process occurs when an individual becomes aware of a problem, is motivated to work on it and it results in some form of creative output. "Thus creative process can be conceived as an input of new, potentially useful ideas, a series of developmental stages or hurdles which those ideas must pass, and an output of innovative products" (Andrews, p. 119). Firstly, a new idea is achieved through the creative thinking process by making remote associations. Then, this idea is evaluated in terms of how it will contribute to solving the problem. An underlying factor of the evaluation is the creator's criteria for acceptability. The idea is assessed at a conscious and sub-conscious level. If the idea is judged to be useful, or worth trying, it needs to be communicated to others, this communication will involve additional resources

like computers, new tools, time and working space. Once an idea is sent by the communicator and received by others, feedback will result in further action to take place for the idea to be implemented (Andrews, 1975).

Fiore, Kimle and Moreno (1996) note many of the difficulties in the formalization of the creative process. These difficulties are due to the way in which data in creativity research is collected, because of the dispute over the acceptability of measurable data versus the use of insight and feeling to describe an experience. One such difficulty arises when trying to obtain quantitative scientific data on the creative process in a laboratory, as there is an inherent lack of control regarding the stimulation of a creative process in such an unnatural setting. There is also concern over the comments given by artists or designers regarding their creative process as often their responses focus on immeasurable things such as feelings and insight. "The creator's comments on the creative process tends to express the intended ambition rather than define what has been achieved"(Fiore, Kimle, Moreno, 1996, p. 35).

Other authors have approached this topic with more success (Tijus, 1988; Perkins, 1981; Archer, 1984; Jones, 1984; Luckman, 1984 in Fiore, Kimle, Moreno, 1996). They use qualitative methods such as interpretation of artist's letters, journals and sketches and include interviews with questions about the creative process while the artist is at a particular stage in the work. The results of this form of study reveal that the artist, at a cognitive level, follows logical evolutionary steps which lead to the final product. It also reveals that these steps often are encountered and solved at an alarming rate, so fast that the designer may not be aware of their migration through the creative process (Fiore, Kimle, & Moreno, 1996).

Fiore, Kimle and Moreno (1996) have also indicated a discrepancy between the literature written on the creative process in the field of textiles and clothing as compared to other fields, such as art and design. The discrepancy is that the majority of the articles written in the textiles and clothing field focus on ideas relating to the development of logical thinking in apparel design, rather than the approach which is taken in other fields to foster logical and creative thought processes. In other words, the literature in the fields of textiles and clothing, especially in design, tend to focus on techniques and end product of the process rather than also focusing on how to foster creativity in apparel design.

Design processes

Descriptions or explanations of the design process are vast in number and range in format from concrete conceptual frameworks to less clearly defined views, such as personal philosophies. The broad scope of design process explanations requires careful examination to determine their suitability, application and, if necessary, modification to adapt them to a designer's personal creative process.

Conceptual frameworks for the design process

Various conceptual frameworks have been developed to illustrate or to help delineate the stages a garment designer may go through from the birth of an idea to its final implementation/production. Fashion design often escapes the world of theory and is rarely analysed at the same level as other fields. "...few people speak analytically about fashion, instead preferring the commercially charged hyperbole of fashion enthusiasms" (Martin, 1988, p. 24). Conceptual frameworks have been developed to map out the stages that a garment, or idea for a garment, must go through before it reaches a tactile stage.

Orlando-DeJonge in Susan Watkins book Clothing: the Portable Environment (1984) created a conceptual framework for the field of clothing design for special needs. The functional design market has brought to light the need for a new type of designer, that is, a designer who problem solves according to a specific situation (Orlando-DeJonge, 1984). Functional design requires a viewpoint which weighs and balances the importance of function versus aesthetics. The objective of this design process is "...combining the creative process with strategy control. The clearly defined pieces of the problem are integrated into a holistic, creative and effective solution" (Orlando-DeJonge, 1984, p. vii).

Orlando-DeJonge's conceptual framework is a seven stage process which thoroughly explores the design problem (figure 6). The problem is introduced through a request for a garment design. This initial step familiarizes a designer with the design problem through briefly describing the needs of the wearer. The second step is called "Design Situation Explored" and the general objectives are outlined and researched by observing existing designs to understand their inherent flaws. Other research is also gathered to explore the design problem. This research includes reviewing the available literature, brainstorming, and interviewing users. Stage three is called "Problem Structure Perceived". At this stage, observation of the clients in the field should take place.

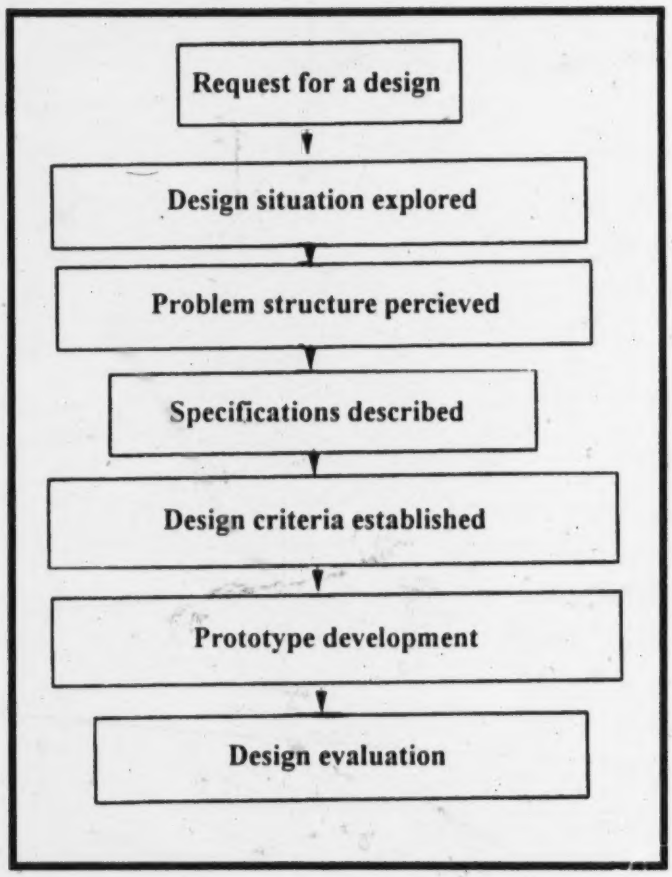

Figure 6. The functional design process conceptual model delineates the seven stage process for progress towards an acceptable prototype. Note. Adapted from "The design process," J. Orlando-DeJonge, 1984. In S. Watkins (Ed.) Clothing: the Portable Environment, p. viii, Iowa: Iowa University Press.

Unfortunately, this stage is often neglected and can result in the development of an unsuccessful prototype (Orlando-DeJonge, 1984). The analysis of field observation leads to market analysis, another literature search and, finally, a concise definition of the problem. Stage three allows the designer to isolate specific design needs and critically evaluate the design as it has been developed thus far. The fourth stage, "Specifications Described", is an evaluation of the literature reviewed and analysis of the design situation in terms of activity, movement, impact, social-psychological factors, and, if necessary, thermal assessment. From the evaluation results, design criteria are established for the fifth stage. In this stage the design needs are weighed and ranked according to their importance to establish priorities. The sixth step is "Prototype Development". In this stage the design criteria are used to develop a prototype. The final step is "Design Evaluation" where the prototype's success is determined by its adherence to the objectives and design criteria.

The stages and approach involved in the conceptual framework for functional design may vary according to the design request. As with many other processes, this framework is not entirely linear. It allows for problems to be encountered and the re-evaluation of a previous step to take place before advancing towards prototype development. The development of a step-by-step program creates criteria by which the functional design process may be initiated and evaluated (Orlando-DeJonge, 1984). The functional design framework is carefully and effectively laid out with respect to the analysis and application of design elements to meet a special need. However, elements of this framework may not be as effective when applied to fashion design as the objectives and design criteria are different than that of functional design.

A conceptual framework that aptly describes the apparel design and manufacturing process is the engineering design process theory (Regan, Kincade & Sheldon, 1998). This theory is the basis for most apparel design models, including the functional design model, and is well recognized for its structured holistic approach to design and product development (Regan, Kincade & Sheldon). It is based on the idea of identifying needs and designing a product to fulfill the specified need. The engineering design theory is a linear six-step process that describes design development and includes the following stages: problem recognition, problem definition, exploration of the problem, search for alternatives, evaluation and decision making, specification of solution and communication of solution. The engineering design process theory focuses on the mass production of a design, this is different from the functional design process which focuses

on custom designs for very specific design problems.

The first step is "Problem recognition", in this step a need is described and objectives are outlined. The objectives would include a statement of the problem, some initial ideas of solution and sketches of the ideas. The next step, "Problem definition", is to create a synopsis of clearly defined objectives and performance criteria, to list available resources and limitations, and to outline any foreseen complications. "Exploration of the problem" is a step where the design requirements are tabulated and ideas are generated including; remodification of previous designs, market research and costing of production. This stage often involves brainstorming activities to identify new and potentially useful ideas and approaches to the design problem. The next stage, "Search for alternatives", is the development of the design proposal where the designer relates all the previously gathered information to his/her experiential knowledge as well as the customer requirements to develop the design idea. In the "evaluation and decisions" stage the design proposal is reviewed to ensure a successful product by evaluating the design for feasibility and to ensure the design meets the objectives. "Designers evaluate design proposals for ideas, objectives, differences and values. A challenge is to avoid guesswork or intuition" (Regan, Kincade & Sheldon, 1998, p. 38). "Specification of solution" is the stage where the best design solution is compared to the specifications outlined for the design and its performance. The final stage is "Communication of solution" this is where the design is communicated, textually and visually, to the engineering, manufacturing and administrative personnel. The design must be approved by management during a formal meeting to ensure the elimination of potential errors. The approved design is then taken to production.

The engineering design theory is a very linear framework that attempts to ensure all the design specifications are met before a prototype is created. This type of process is most applicable to large-scale manufacturing where a mistake in prototype development can have huge fiscal implications (Regan, Kincade & Sheldon, 1998). This process also relates to the design process not as an individual activity, rather, as a team project that requires explicit communication of idea development. In this way, the engineering design theory process is depersonalized to account for the multiple individuals who work on product development.

Lamb and Kallal (1992) developed a conceptual framework for garment design that involves six steps to take an idea into form (figure 7). The conceptual model of the apparel design framework depends upon criteria outlined by a profile of the user, based

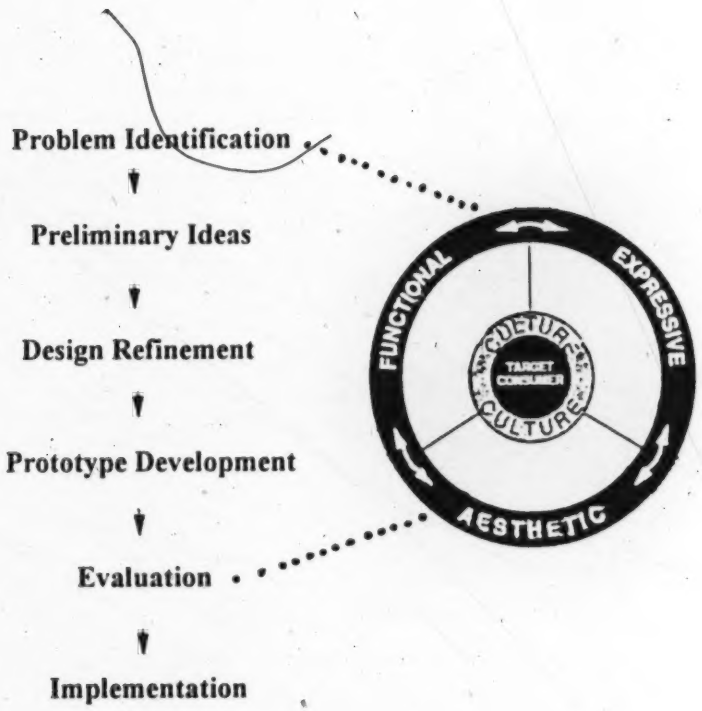

Figure 7. The apparel design framework illustrates the stages of design involved in the development of a garment or line of garments. Note. Adapted from "A conceptual framework for apparel design," J. M. Lamb and M. J. Kallal, 1992, The Clothing and Textiles Research Journal, 10(2), p 44.

on a consumer needs model. Figure seven shows how this circular consumer needs model has multi-layered areas that inter-relate and affect the apparel design process at different stages (Lamb & Kallal, 1992). The interdependent nature of the categories of the consumer needs model act like a continuum, with different needs taking precedence according to various design criteria. Identifying these needs will then affect how the designer deals with the design problem within the apparel design framework.

The first step of the conceptual model of apparel design is to "Identify the Problem". For a fashion designer this is the identification of the target market, type of collection and other elements on which to base the designs. This stage includes, general objectives that must be met in developing a successful design. The second stage is "Preliminary Ideas", which is the most creative stage for a designer finding design solutions to the problem. This stage involves brainstorming, sketching, researching and developing surveys and is intended to be an idea-generating step. The third stage is "Design Refinement" in which the designer sets further priorities such as cost and style specifications. Designs developed in the preliminary idea stage are modified, discarded or further developed. This is a very important stage because it offers the opportunity to resolve some conflicts before samples are made which may have cost implications. The next part of the process is "Prototype Development". In this phase, sample garments or samples of pieces of garments are developed to determine effectiveness of design. Garment standards can be evaluated and modifications applied. The fifth step is "Evaluation", where the garment is assessed according to the objectives determined in the problem identification stage. At this stage there is opportunity for additional modifications or , perhaps, a garment style will be eliminated from the collection. The final stage is "Implementation". This stage may not occur until the design is modified and re-modified to a refined stage and then it is executed on a mass or limited scale. All of the stages are interrelated and although designers may not be aware of the stages followed in the design process, they are encountered even if it is sub-consciously (Lamb & Kallal, 1992).

The design process and personal philosophy

The design process may be clearly defined with stages of evolution, or it may be a personal process which is more vague. Jones (1981) analyses the idea of the design process as a personal process through his use of three concepts which externalize and describe the design process. These concepts are illustrated by describing the designer

either as a "black box", a "glass box" or a "self-organized system". The idea of the designer as a black box refers to the creative view point in which the design evolves due to mysterious creative leaps within the designer's mind. The glass box concept views the design process as a rational viewpoint in which each stage of the process is logically explained. Finally, the idea of the designer as a self-organized system illustrates how the designer has control over the design process and incorporates elements of the black box and glass box concepts.

The designer as a "black box" indicates that the most important part of the design process occurs within the mind of the creator, out of reach of conscious control. Therefore, the designer is able to create designs without being able to say from where they originated. The "black box" view extols that the human nervous system controls some elements of the design process which cannot be precisely explained. This illustrates that the design process occurs mainly within the mind of the creator absorbing inputs from the environment and processes and interpreting these inputs in a variety of ways. The 'leaps of insight' described by so many designers is actually the result of their subconscious' absorbing and patterning information from the environment until it formulates some acceptable concept relating to the design problem (Jones, 1981). The concepts formulated by the designer during the design process are referred to as idea links. Creativity stimulating exercises, such as brainstorming or synectics, are used to help the subconscious create idea links to solve design problems faster (Jones, 1981).

The notion of a designer as a "glass box" is based on the assumption that the design process is entirely explicable even if designers are unable to give reasons for the design choices they have taken. According to this view, designers have full knowledge of what is occurring during the process and why they are making those design decisions. This suggests that the design process is a rational, linear process in which the designer has complete control. To obtain a "glass box" model of design the designer has to pre-establish criteria for the process. For this to occur, the designer must have objectives, variables and criteria for the design fixed in advance. The designer must also have completed the analysis of the design problem before a solution is sought. The evaluation of the design problem is mainly logical and easily explicable and the strategies of design must be pre-determined. The process is completely linear and rigid, with all the criteria established even before the design decisions can be made.

Both the "black box" and "glass box" concepts of the design process have been criticized for their incomplete explanation of the process. The "black box" concept is

criticised for the lack of research on the meaning or reasoning behind the actions taken by designers during the design process. Research focuses on the creation of idea links within the creator's mind, but not on how those idea links become actions within the design process. The "glass box" concept is criticised because of the rigid process which is difficult to comprehend because of a designer's experimentation and exploration within the design process. Incorporation of the concepts of "black box" and "glass box" is found in the design process of the designer as a "self-organizing system" (Jones, 1981).

The concept of a designer as a "self-organizing system" illustrates the design process as a division of design efforts that parallel and incorporate the concepts of the designer as a "black box" or the designer as a "glass box". In the designer as a "self-organizing system", the design process is divided into two elements: the part of the designer that carries out the search for a suitable design (the "black box" element) and the part of the designer which controls and evaluates the pattern of the search (the "glass box" element). This concept uses the strengths of the glass and black box theories by allowing the designer the freedom of utilizing the creativity of the produced idea links, even if their origins are unexplained, while still maintaining a framework for evaluation of the idea links to keep the process focused.

The design processes discussed above are examples of generalized concepts encountered by most designers during the creation and evolution of a design. From these concepts an even more personalized process can be generated. Martin (1988) summarizes the design process encountered by Issey Miyake through a description of the concepts which guide his process of design. The stages of design delineated by Miyake are expressed not in terms of how his ideas take shape, but rather his philosophy on the creative process of design as it relates to his work.

Many designers find it difficult to verbally express their ideas regarding the purpose, reasoning, or meaning of the clothes that they create.

> At certain times, I believe certain things. My beliefs are fleeting. That's why I'm troubled when asked to state my policies, my beliefs. If I could express my beliefs in words, I wouldn't be making clothes (Miyake in Martin, 1988, p. 101).

Miyake's personal statement on the creative process describes it as a continual state of evolution. His personal design philosophy is expressed through text and image as they are intertwined and inseparable (Martin). The concepts of design evolution developed by Miyake are based on his equation that clothing is a sign, a form of communication that is

categorized into three stages of design progression evident in his work between 1970-1977. The foundation of his design concepts are based on the elemental role of clothing as adornment.

Miyake's concepts were developed by applying principles of wrapping and adornment using traditional Japanese materials and then applying these findings to other mental constructs. The actual development of his ideas was to gain an understanding of the origins of clothing, as well as to explain his artistic self-exploratory process (Martin, 1988). Miyake's first stage is "Man and his clothing" which describes clothing as its most basic form of body wrapping for protection. The second stage is "Form of Cloth". In this stage, a metamorphosis takes place as the wrapping on the figure evolves. More fabric is used, more movement is allowed and the fabric begins to exert its autonomy as the focus shifts from the figure wrapped in cloth to the cloth itself. It is in this stage that the illusion of clothing is explored "Drapery assumes an often Baroque life of its own emancipated from the form of the figure, thus moving beyond the initial address to clothing as a wrapping to the independence of the forms of cloth" (Martin, 1988, p. 26). The final stage of the personal design philosophy of Miyake is "Witness of Time". This stage is more cognitive and less clearly defined than the other two stages. Conceptual notions of clothing as second skin and its symbiotic relationship to the wearer are explored in this stage.

The first two stages explored the history of clothing and its basic role of adornment and its evolution to the expressive side of cloth. The final stage of Miyake's design concepts challenges the role of clothing by presenting the idea that clothing has a life beyond its wearer and that the wearer is secondary to it. "Witness of Time" is a personal statement which relates his work as an expression of his design concepts and emphasizes the importance of not displacing the designer from his work.

> But today thoughts and ideologies are being accepted for what they are, regardless of their source of inspiration. People are beginning to realize that whatever the form in which talent is expressed, that talent is not separate, cannot be separated, from the thinking in which it is rooted (Kurimoto in Martin, 1988, p. 27).

In summary, the scope of design processes ranges from concise progressions through a conceptual framework such as those offered by Orlando-DeJonge (1984) or Lamb and Kallal (1992) to the conceptual ideas of Jones (1981) to an expression of personal experience which involves intuition and cognitive thought as outlined by Martin

(1988) in reference to Issey Miyake. The variety of design process frameworks can be used as guidelines and elements of each could be modified to the adaption of a personal design theory.

Summary

This review has covered some of the phases that a designer encounters during the creative apparel design process. The concepts include: creative thinking and processing, the cognitive spiral, analysis of design process conceptual frameworks and the development of personal design philosophy. In the literature, each concept is as an individual element, while in practical application, a designer has to make decisions on how to integrate and deal with each concept. Questions which are raised by the lack of integrated research available in this field are: "At what stage does the creative thinking process occur during the apparel design process?" and "Will a focus on the process, not the product, of creative and design processes allow for greater awareness of the experiences encountered by the designer during these processes?" It is interesting to see how each separate, and seemingly isolated, concept relates to my research concerns. As I entered the initial stages of research, my interests were determined by factors that influence the process of creative apparel design. I had three major areas of concern which needed to be integrated and resolved. Firstly, to focus on the creative thinking aspect of apparel design in order to challenge and expand my design knowledge. Secondly, the tracking of the creative thinking process of clothing design so that it can be used as an evaluative and learning tool in the design process. Finally, to learn more about the way in which I design, including how I express my creativity through the design process.

Chapter 3
Methods

Research Paradigms and Perspectives

Formalized theoretical frameworks are rare in the field of fashion design. Designers, historians and other interested parties tend to view fashion on a superficial or descriptive level rather than discussing it analytically (Martin, 1988). The reason for the lack of theoretical background in such an expressive form of communication can only be speculated. Perhaps it is due to the instilled belief that interest in clothing is a form of vanity. Or perhaps it is because the communicated message of clothing is more subtle than that of text and, therefore, more difficult to formulate a concrete conceptualization. (Hollander, 1997). Due to the lack of reference to theoretical background in the field of creative apparel design, concepts are borrowed, adapted and interpreted from the social sciences and other design fields including industrial design and architecture. These borrowed concepts can lead to the development of a more concrete conceptualization of a theoretical background from which to approach and document the process of creative apparel design.

The use of interpretive paradigms is helpful in defining research methodologies. A paradigm is a type of formalized perspective which will affect the formation of a research question and the way in which it is tested. Interpretive paradigms are evolving as researchers accept or reject the concepts which they outline. Constructivism is a paradigm which emphasizes that what is real cannot be assessed objectively, but only through the constructs of the observer, and reflexivity, which emphasizes that the observer is part of the system being observed (Doherty & Baptiste, 1993). This concept affects the way in which a study is approached, specifically in referring to the purpose of the inquiry, the evaluation procedure and the 'voice' of the study.

Attempting to categorize my research question is slightly problematic as it is difficult to clearly conceptualize some of the intuitive elements which occur in the creative apparel design process. However, the constructivist paradigm is the most applicable mode of inquiry for my research as it has elements which will help to define my research strategy. Relating the creative process to a social science perspective is extremely difficult as the collection of data and analytical processes within these two fields are different. However, this paradigm, as I used it, can be adapted to its basic principles and

modified to suit my research problem. The purpose of a constructivist inquiry is to gain understanding and to reconstruct the multiple levelled concepts people hold to be true. This purpose is based on the idea that information and sophistication evolves and progresses. These concepts have to be adapted to my research as the format which they follow are more suited to anthropologists or historians. For example, an anthropologist may look at the multiple realities evident in different societies' view of beauty, where as, my research will involve the awareness and acceptance of the multiple reality levels encountered or reconstructed during the design process. These levels may include my role as the researcher, my role as a designer and my role as evaluator of the work. I also wished to gain an understanding through reconstruction, however, the use of this term does not refer to reconstruction of social strata, rather the reconstruction of design concepts or production techniques. My reconstruction, through the development of samples and prototypes, was used as one of the forms of experimentation or documentation which underwent evaluation in the formulation of conclusions in the study, as an indication of the understanding acquired.

The constructivism paradigm places value on judging the quality of the inquiry or experimentation. The criteria to which the experimentation is compared are those of trustworthiness, indicating credibility, and authenticity indicating fairness. These two concepts are still undergoing refinement on the theoretical level which accounts for their vagueness, however, they are based on subjective ideals. In my research I evaluated my work and included elements of credibility and authenticity.

The 'voice' in the constructivism paradigm is quite unlike other modes of inquiry. The inquirer's voice in constructivism is that of a 'passionate participant'(Doherty & Baptiste, 1993). As such, the paradigm allows the inquirer to be actively involved in the research and facilitates the expression of the multiple realities evident in the study. This paradigm allows the expression of the multiple voices encountered in the design process. I was the creator within the creative design process and as such expressed the concepts I encountered as a passionate subject as well as from an evaluative viewpoint.

The constructivist paradigm is an alternative inquiry paradigm that is most suited to research in creative apparel design. This paradigm related to and helped to inform my research as I looked for multiple levels of understanding within the problem and allowed for a 'passionate participant' voice within the research which best expressed the views of the creator involved within the creative apparel design process.

Research Design

Paradigms act as frameworks for research and dictate, to varying degrees, the design of qualitative research. Some paradigms rigidly dictate research design principles including the formulation of the hypotheses, defining the sampling style and analysing the data (Denzin & Lincoln, 1994). Constructivism is a paradigm that has a less formal emphasis on tightly defined research design, therefore, allowing for a more flexible research strategy than other paradigms. Constructivism emphasizes that the researcher follow a process of discovery, in whatever manner of achievement, throughout the research process.

The process of design, especially creative design, focuses on the designer and his/her personal process. As such, it is impossible to separate the designer from the design/research process. The constructivist paradigm provides the perspective of the researcher as a 'passionate participant' allowing for direct involvement within the study itself. Guidelines for research design provide another framework in which to formulate a methodological inquiry. Based on the perspective provided by constructivism, the most applicable form of methodological inquiry would directly involve and acknowledge the role of the designer in the design process.

A paradigm presents a formalized perspective from which to situate and guide the research question. Whereas, research design presents questions from which to structure the way in which the research will be conducted. Participative inquiry is a qualitative research design method, used by anthropologists and sociologists, which, like the principles of the constructivist paradigm, allows the researcher to play an active role as co-researcher/co-subject. Participative inquiry is a "worldview [that] sees human beings as co-creating their reality through participation: through their experience, their imagination and intuition, their thinking and their action" (Reason, 1994, p. 324). Reason describes the non-traditional role of the researcher in this methodology as being based on the understanding that human beings have an active role in creating their reality because of an individual's experiences, insights, actions and direct involvement in reality itself (in Denzin and Lincoln, 1994). Due to the direct involvement and influence of humans on their reality, the attempt to make research an objective study in order to search for a separate truth, is not plausible. Therefore, the acknowledgement of the effect a researcher has on their research provides a precise, holistic perspective on the action being investigated. The full immersion of the researcher in the research process parallels the actions and effect of the designer on their creative design process.

According to Dorst and Dijkhuis (1995), the majority of design theory and research focuses on the design process, that is, the steps taken towards the final outcome of the design question. Although this form of research is helpful in creating a background of theoretical knowledge, it does not fully address or describe the experiences encountered by the designer during the process. In order to address the nature of the involvement and control the designer has over the design process or activity, Dorst and Dijkhuis analyzed the usefulness of two different paradigms, positivism and constructionism (constructivism), as a way of describing design activity.

Dorst and Dijkhuis (1995) also discuss how past research has focused on a positivistic paradigm which is a framework that addresses the idea of the science of design. From this perspective the design process is described as a rational problem solving process in which the designer is the catalyst for the linear design process. This paradigm suggests that logical analysis and thought about the problem lead to a more generalizable description of the design process. Whereas, a constructionist paradigm is a framework which views the designer as a reflective practitioner deeply and directly involved in the design process. From the constructionist viewpoint each design question is a distinctly unique problem which depends upon the key skills of the designer and that individual's decision of how to approach and deal with each problem.

Both of these frameworks are based on the assumption that the steps in the design process are controlled by the designer's decisions. These decisions are based upon the designer's experiential knowledge and are important to the understanding of the process. The designer's view or perception defines the design situation objectives, including goals and possibilities for design. Although each paradigm depends upon the designer's decisions, the amount of designer involvement within the process differs. Positivism suggests that the designer rationally works through a series of logical steps towards an acceptable conclusion. Whereas, constructionism suggests that the designer internalizes and works through the problem using double loop learning techniques, as described by Reason (1994).

The designer who engages in reflective conversation, or reflection in action, is utilizing double loop learning techniques within the design process. Schön (1983) most aptly describes the process of reflective conversation from the designer's context. "He [the designer] shapes the situation, in accordance with his initial appreciation of it, the situation "talks back", and he responds to the situation's talk back" (p. 79). It is this talk back process that allows for the re-framing of the design situation which will then guide

any new moves or decisions the designer makes (Schön, 1983).

The results of the Dorst and Dijkhuis (1995) study indicate that logical problem solving is an effective way of describing the logical links between steps in the design process, but it does not explain the context in which those steps were taken. Therefore, it shows patterns within the process which create generalizable conclusions about the linear process of design, but it does not explain how or why the designer chose to make those decisions. Therefore, according to Dorst and Dijkhuis (1995) reflection-in-action is a more useful way of describing design activity as it combines the content and process part of the designers' actions. Reflection in action focuses on how designers are active in structuring the problem by not evaluating its concepts, rather they evaluate the results of their own actions during the problem solving process. The frame of reference for the reflective elements of the process are based on underlying background theory that corresponds to the personal view of the designer (design philosophy) as well as their goals. The constructionist paradigm focuses on the content of the design activity that relates to the process of design. However, because the description of the design process depends upon the problem and the way it is handled by the designer, it is difficult to compare situations and draw general conclusions.

At this stage the idea of reflective conversation is not as highly developed as that of logical problem solving. However, reflective conversation is a more effective way of describing the design process experienced by the designer than logical problem solving. "Describing design as a process of reflection-in-action works particularly well in the conceptual stage where the designer has no standard strategies to follow and is proposing and trying out problem solving strategies" (Dorst & Dijkhuis, 1995, p. 274).

Procedures

The concepts of constructivism and participative inquiry guided my study as the researcher and the designer during my creative design process. The theoretical and conceptual frameworks provided a perspective from which to view and evaluate the process. The documentation of a personal design process is a relatively new undertaking, both for myself and the general population and needs further exploration. Apparel designers often find it very difficult to express, in words, what their designs mean. This is not an unusual problem as many designers find it redundant to explain what the garment says so clearly! Personally, when I try to explain what the object means, upon its completion, the words sound trite as they cannot fully encapsulate the creative

dawning of the initial idea into tactile form. Whereas, pictures can explain or add some other element to the meaning of the designed object. Therefore, the combination of illustration, images, text and reflective dialogue may be a more effective way of expressing the birth and evolution of an object within the creative design process. To accommodate for the visual and textual nature of the creative design process I used three documentary techniques; brainstorming, visualization and reflection. The use of these techniques enabled me to express the process through images, sketches, text, reflective conversation and other forms of media.

Brainstorming is a design method in which all parameters for the design problem are disregarded in order to explore other ways of thinking. Brainstorming is accomplished by reaching into and triggering creative thought through the production of a large quantity of ideas regardless of their probability (Jones, 1980). It is often performed within a group, but for my study it was an individual activity, therefore, a large number and variety of activities were explored.

Visualization is a method that expands upon ideas created within a brainstorming session to express the development of a design idea (McKim, 1980). Visualization is a process to document the evolution of the designed object, its changing state or elements by illustrating an idea, in all its forms, on one piece of paper. The illustrations are a reference tool which pictorially records the idea leaps a designer makes from one illustration to the next. Although this process can be difficult due to the challenge of drawing a three dimensional object on a two dimensional surface (Renzi, 1996) it is an effective way of recording evolution within the design process.

Reflective conversation is the method used to record my thoughts and choices during the design process. As indicated by Dorst and Dijkhuis (1995) it is the most effective way of expressing the actions and experiences of the designer during the design process. The textual documentation occurred in two stages, during development of the design and upon reflection about the choices made during the process. Text was recorded on the illustrations, to make textual links between stages of evolution, for reflective evaluative comments and to lead to a higher level of understanding of the process of creative design.

Brainstorming, visualization and reflective conversation were used to document the formal study of the creative apparel design process. Ideas were recorded using a sketchbook/scrapbook from the inception of a creative idea to the initiation, discussion and evaluation of the creative process. A line of garments, consisting of nine pieces, was

developed from the initial creative ideas and their evolution through the design process was recorded. Finally, through documentation I recorded the process of taking an idea through to the development of a prototype.

Chapter 4
Design Process

The documentation of my creative design process occurred by recording visual and textual information about the thinking and action stages during the development of a line of garments. Thinking metacognitively, while being engrossed in the process, was a new experience. Initially, trying to record all of my thoughts, feelings and actions proved to be quite difficult. Recording textual information, while sketching or exploring trigger ideas, hampered the natural flow of my thought patterns. Therefore, I decided to reflectively document comments in my journal, after sketching or working with visual elements of the process. In this way, I was not trying to force text about non-textual activities.

To effectively describe the elements encountered during the creative thinking and design processes, the documentation was sub-divided into categories. The categories were divided into elements to aptly describe what was encountered during evolution of the creative designing process. These subdivisions were not necessarily concrete stages that occurred in sequential order, rather they were easily identifiable elements used for clarification. These elements include: the thinker/designer, customer profile, trigger mechanism, evaluation, information gathering, discovery, creative breakthrough and prototype development. The thinker/designer element outlines influences on the line development by relating the trigger mechanisms used to augment the designer's experiential knowledge. The customer profile stage identifies the target audience, describing needs to be met and identifying who will likely financially support the designer's work. The trigger mechanism is the sparking of an idea that initializes the actions of the process, commonly known as inspiration, that initializes the actions of the process.

Evaluation is a decision-making mechanism that occurs within many of the elements, altering, motivating and guiding the process. Gathering information is the researching component where various forms of media and materials are explored and gathered to help develop the trigger idea. Discovery is an action filled component of sketching, collage making, cutting and pasting. The creative breakthrough occurs in many of the aforementioned components; it is the dawning of a new idea developed from relating the gathered information to the designer's experiential knowledge. The final stage is prototype development where samples and full-scale garments are constructed.

The Thinker/Designer

I have a love of fabric and tactile materials and I use these items to express my feelings and work through the ideas that challenge me. I find words limiting as I am unable to fully express the level of passion I feel about garment design. I am a visual learner. I absorb information through diagrams, illustrations and participation. My background, or experiential knowledge, includes a love of museums and antiquities, a curious nature, a love of travel and things which are out of the norm. Although my focus is apparel design, I have also been formally educated in art history, the classics, costume history and the preservation and conservation of textiles.

Designer's Statement: Creative apparel design is often viewed on a superficial level as though it does not have meaning. However, for apparel designers, this is the medium chosen to voice ideas. The garments I design express my relation to my near environment and my view of the future. They embody the process of questioning and resolving my experiential knowledge and transforming it into a concrete form. Ultimately I hope my garments reflect the following statement: The future of fashion is a dream-like state, drifting... where reality and fantasy collide. Creativity is the expression of that dream, intuitive in nature... pre-verbal forms illustrated by multi-levelled symbolism.

Customer Profile

The purpose of a customer profile is to direct the design of garments towards a clearly defined target market. Target marketing is a strategy in which a business directs its product and marketing at a specific type of clientele (Pinson & Jinnett, 1989). A clear vision of who the customer is, what type of lifestyle they lead and how much they are willing to spend to express their sense of style, will influence the development of a line of garments (Tain, 1998).

Designers research their clientele in a variety of ways. Some hire marketing firms or have an in-house marketing department to keep in touch with customers' needs (Tain, 1998). Others organize trunk shows where the designer tours with the new line and meets directly with the customers (Tain). However, most designers rely on indirect marketing research for trying to predict emerging trends and designing for a specific category of dress and lifestyle.

The common element in developing these customer profiles is that the design process is driven by the consumer. Therefore, my design process began by centering my focus on a target market or client, otherwise known as the development of a customer

profile. Unlike other designers, I did not predetermine who I would focus on, rather I gathered magazine clippings that described or reflected my design philosophy (Figure 8). I collected clippings which illustrated a love of detail, handcrafting, irony, glamour and individuality. I then began to categorize these criteria into the most generalizable description of a population they would appeal to, including age group and income level. The outcome of my target market development is that my garments are designed for well educated adult females, who have a love of art and detailing and are willing to pay a higher price for pieces that reflect the message they wish to convey.

Trigger mechanism

Designers are often asked to identify their source of inspiration for a garment or line of garments. However, in working through my creative design process and by thinking about the way in which I think and process information the term trigger mechanism better describes the source of inspiration. This term describes the birth of an idea as a result of a resolution between internal and external stimuli. Trigger mechanism is a dynamic term; it embodies the action of the creative breakthrough as if a light has been shone on a previously darkened area of the mind. It is difficult to describe the creative design process before the triggering idea has occurred. As a designer, I am constantly absorbing all forms of information which may then spark an interest in further exploration through the creative design process. The identification of the trigger mechanism is very exciting. In hindsight, I realize that the triggering mechanism for this line of garments developed over a long period of time. In my travels I have seen countless outdoor sculptures and monuments, for example, a replica of Bill Reid's "The Spirit of Haida Gwaii" on a very rainy day in Vancouver. This metal sculpture was slick with rain as the water slid down the crevasses (Figure 9). During a visit to Toronto I noticed a Henry Moore sculpture outside of the Toronto Art gallery. It had garbage blown in from the street caught in one of the nooks and graffiti on the side (Figure 10). It was these pieces that made me more aware of the outdoor sculpture on the university campus and in other parts of the city. It was these contacts with outdoor sculpture that percolated in my mind and then triggered the question: How would the elements of outdoor sculpture translate into garment design?

Figure 8. The customer profile presentation board helps to define the target client, this board describes a woman who is well educated, interested in art and fine detail, as well as being willing to pay more for unique garments.

Figure 9. "The Spirit of Haida Gwaii" by Bill Reid. Installation in the Canadian Embassy, Washington, D. C. USA.

Note. Photo from http://www.cdnemb-washdc.org/culture/haida.html

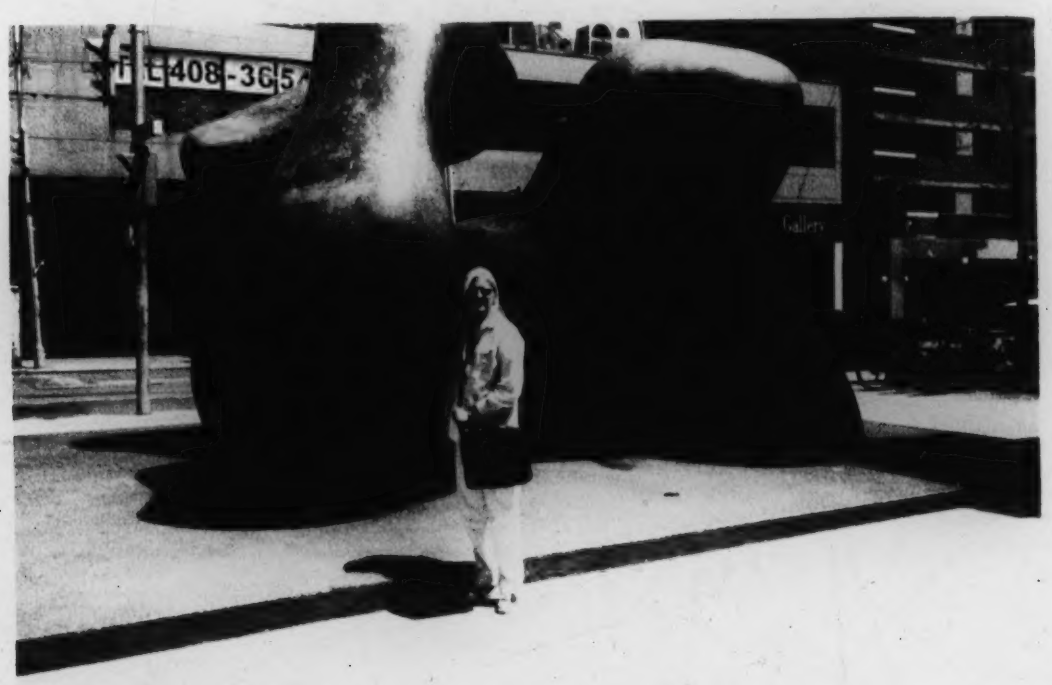

Figure 10. Henry Moore sculpture located in front of the Art Gallery of Ontario, Toronto. (Photo by R. Bailey, 1997).

Evaluation

Evaluation is an integral component of the creative design process and in the apparel design models previously discussed, it is considered to be an individual stage of the process. The reviewed research illustrates that evaluation is a separate step located near the completion of the process. By viewing evaluation as a final step in the process there is no accommodation for the decisions made during each step of the process. Lamb and Kallal (1992) presented a six step process for apparel design in which evaluation was the fifth step, at which point the prototypes developed are assessed according to the objectives outlined in the problem identification stage. Although this evaluation is an important element of the process, it does not account for the decisions made during the previous stages; problem identification, preliminary ideas, design refinement and prototype development. Lamb and Kallal's usage of the term evaluation is much like the way I have critiqued or reflected on my line of garments after the process has been completed. In the engineering design process theory (Regan, Kincade & Sheldon, 1998), evaluation and decision making is considered to be the fifth step of the design process, where the design is determined to be satisfactory or unsatisfactory according to criteria such as performance objective. In this model, on which most apparel design models are based (Regan, Kincade & Sheldon, 1998), it is specifically addressed that the main challenge during the design process is to avoid decisions based on intuition. This statement, in effect, negates the importance of the thinker/designer and the experiential knowledge from which the creative product evolves.

The reasoning behind the omittance of the evaluation and decision making actions, during each stage of the process, from these models is unknown. Perhaps, it is too difficult to document due to the intuitive way decisions are made by the thinker/designer. Despite its omittance from other design models evaluation is such a motivating factor in the evolution of the creative design process I have chosen to acknowledge its actions during the process. However, evaluation is not delineated as a separate step, rather, it is an integral component of each stage of the process. Throughout the stages decisions are made that, based on the designer's criteria, will affect the evolution of the process. A designer will base these decisions on feasibility, cost, time management and availability of supplies, all in relation to their experiential knowledge.

Gathering information, Discovery and Creative Breakthrough

These stages are difficult for me to discuss separately because they are not distinct

as they interact and continually combine. By describing each stage separately the process would be trivialized as it would be dissected into multiple, seemingly random thoughts and actions that do not occur in a linear manner. Therefore, the grouping of these stages effectively illustrates the complexity of the creative design process. Thus, showing how an initial thought moves through the stages that, in turn, interact, move backwards and forwards, diverge on tangents and influence subsequent actions. I will describe my gathering of information, discovery and creative breakthrough, wherever possible, using quotations from my design journal.

The beginning of the creative design stage is especially exciting as the possibilities and ideas are endless. I began by looking for clippings of outdoor sculpture and by visiting sculpture web sites, including parks which house other Henry Moore works. I then worked on an image storyboard, I made a collage of the clippings relating to shape, form, colour and texture (Figure 11). I then sketched one of those sculptures and ripped up magazine pictures and organized the pieces, like mosaic tiles, into colours to make a collage of the sketch (Figure 12).

I was aware of the changing nature of outdoor sculpture how the piece interacts with its environment; it may oxidize, be defaced, or defecated on. Weather also affects its look. When it rains the material may look polished or dull; when it is sunny it may shine and cause reflections on the ground. Throughout the day, the sun will cause shadows to fall and move around the piece, or within it. I wanted to relate and work with all these elements and translate them into garments.

I began by scribbling with my pastels to try to get the colour combinations found in sculptures. I then took the pastel swatches to the fabric store to get garment materials, in the form of fabric swatches, that looked like sculpture materials. The fabrics I was looking for had to reflect elements of the sculpture, either in colour or texture. I focused on finding fabrics which looked like concrete, stone, metal or rust (Figure 13). I worked on idea-generating exercises, such as word association and collage, and then stepped back to let my subconscious work with these ideas.

I then tried another "word association" exercise to add more ideas. From one word association, I linked the ideas of sculpture forms to construction techniques. Oxidation could be represented by the colour and texture inherent or applied to a fabric. To represent curves, the garment may have princess lines or have other curved design lines incorporated. Grooves and etching can be represented by pintucks or trapunto. Shadows can be illustrated through pleats or folds. These ideas led to the first series of

Figure 11. Idea collage illustrates colour schemes, shapes and sculptures that contribute to idea development.

Figure 12. Mosaic-like collage in the shape of Henry Moore's "Double Oval".

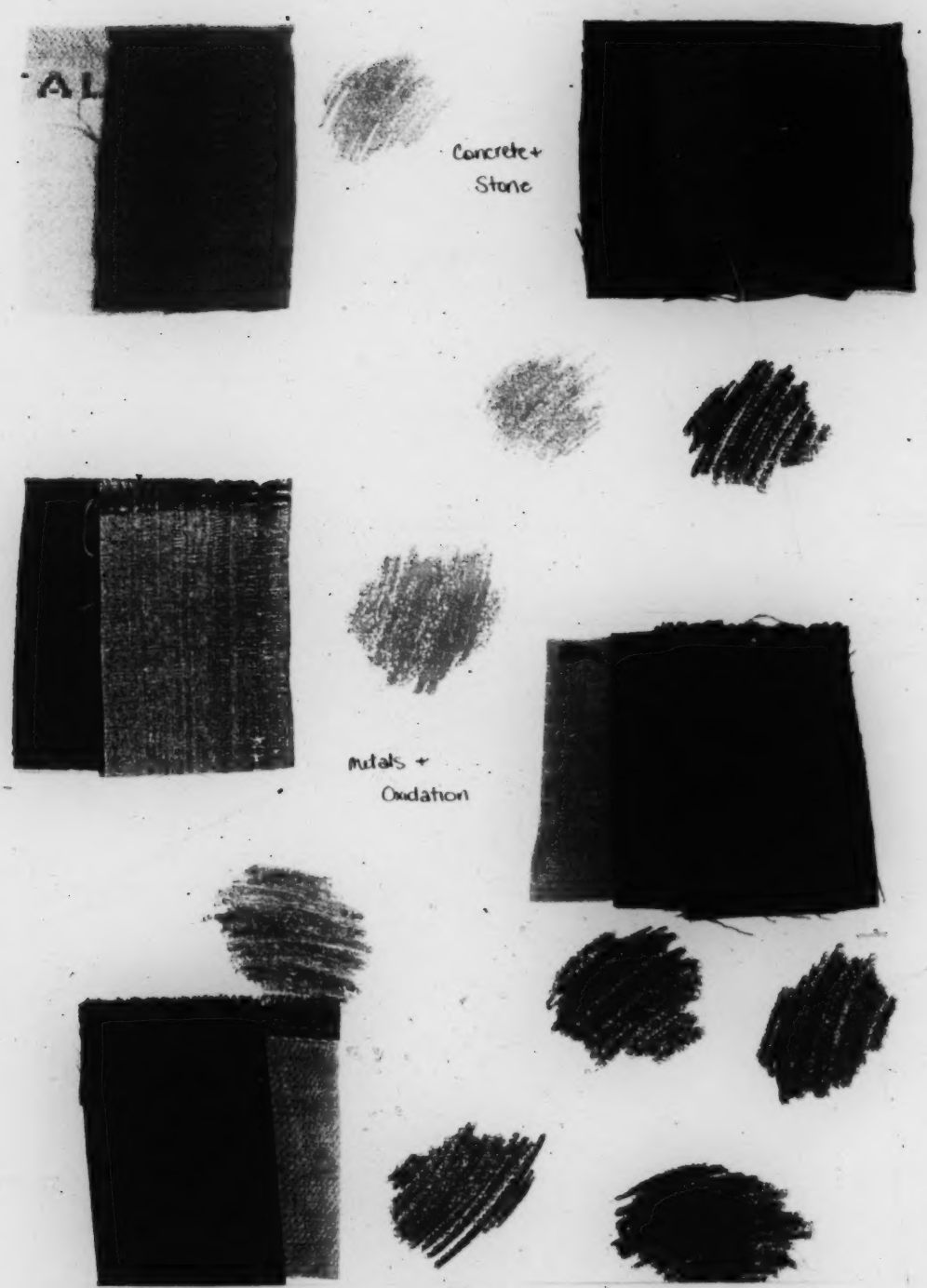

Figure 13. The colour chart illustrates metallic and stone colours and corresponding fabric swatches.

sketches. Figure 14 illustrates how I began working with ideas of flat planes and small geometric patterns.

At this stage I became discouraged by the sketches. An excerpt from my journal describes how I was feeling:

February 01: The designs so far seem to lack the embodiment of the feelings I get from the sculpture. There is an essence that I am missing. I am still limited by the rules of the garment: placement of seams (shoulder, sides, etc)... The forms I am inspired by have similarities in the feelings they produce and some characteristics (scale, metal), but those elements are missing from the designs. Can I move away from adapting sculptural shapes and directly interpreting them into set designs (e.g. the shape of the hood on the golden jacket directly mimics the shape of the sculpture) [Figure 15]*? I want to move to a more conceptual level where the garment is not bound by rules of seams, etc. I want to incorporate other techniques using fabric manipulation or surface design(beading, painting, burning) to depict these ideas.*

The identification of the need to move to a more conceptual level led to an exercise where I listed surface techniques that would reflect elements of sculpture. For example: burn out on silk velvet could give the impression of marble, gradations in stone or tide lines from water; beading could show reflection of sunlight on metal, or the impression of oxidation of metal; pintucks could indicate raised surfaces, hard edges and cast shadows, especially if made from fabrics with shine, slubs or nap; trapunto could indicate raised surfaces, etched surfaces and also cast shadows (Figure 16). During this time, I also found another picture which was of great interest to me, "Abstraction" by Georgia O'Keeffe . The study of this picture led to sketches (Figure 17). The introduction of this picture did not change the direction of the process, but I was aware that I was changing the direction of my thinking.

February 02: The introduction of "Abstraction" triggered my thinking to revert down the thinking spiral, back to idea generation, but still embodying the previously developed theme and ideas.

Next, I began working with ideas of surface design techniques to reflect the sculptural elements of shadow and oxidation. In hindsight, this new path was a tangent, but it did lead to interesting sketches.

February 02: A combination of discharge and burnout on black rayon/silk velvet ([the burnout] sprayed on with a spray bottle] would create the effect of rust with colours

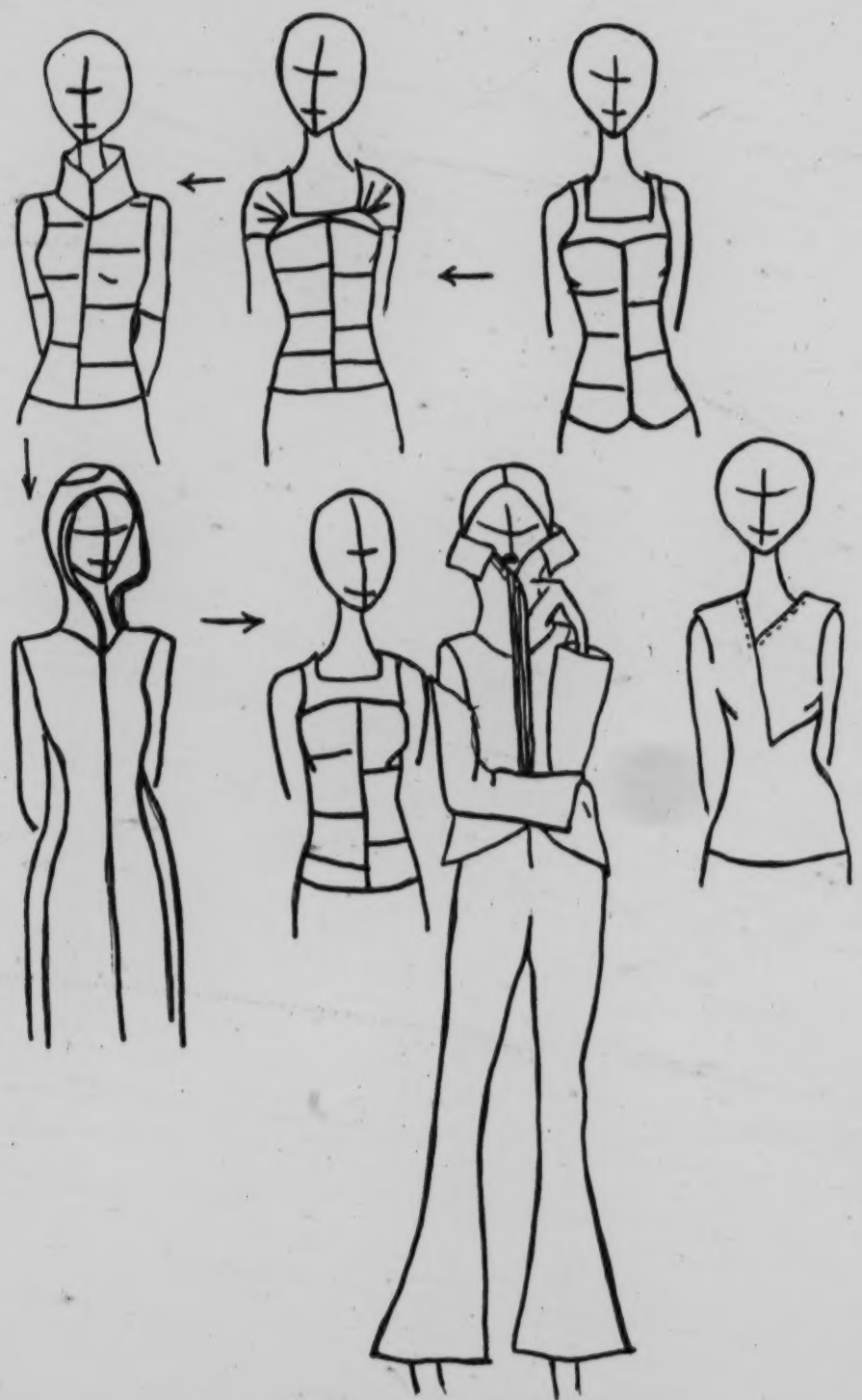

Figure 14. The visualization exercise shows the progression of an idea.

Figure 15. The application of colour, based on fabric swatches, to sketches from the visualization exercise.

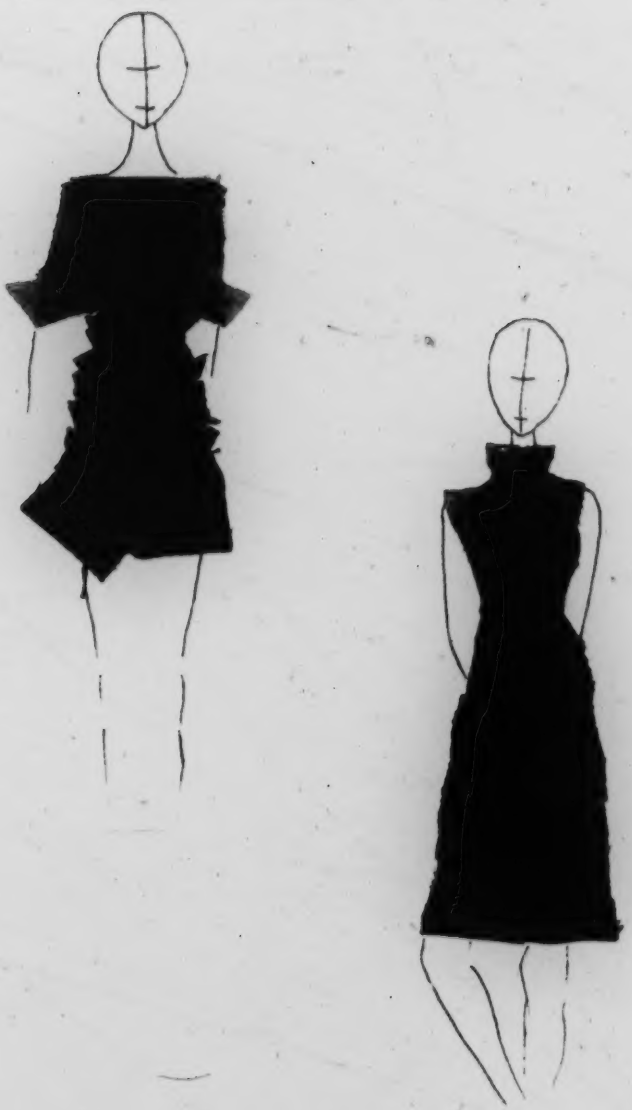

Figure 16. Exploring the application of raised surfaces on fabrics by sketching and cutting and pasting fabrics to the illustration.

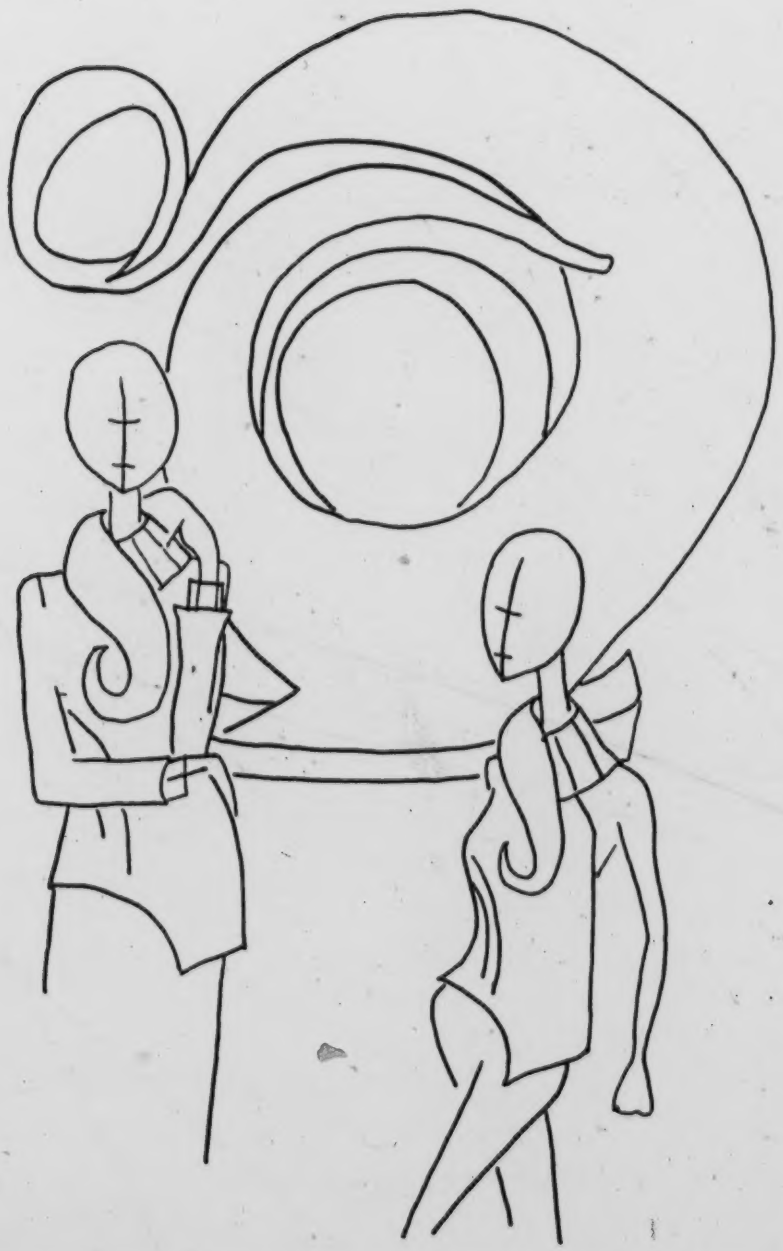

Figure 17. Sketches based on the sculpture "Abstraction" by Georgia O'Keefe (Redrawn behind sketched figures).

(oranges from the discharge) and shadows (from the burnout).

I worked on small samples of velvet that were discharged using various concentrations of bleach solution and burnout using a purchased product called Etch-Away®. The spray bottle discharge solution on black velvet resulted in a mottled effect which showed subtle variation of colour, depending on how the light was cast on it. I could get a similar effect on other types of fabric by sponging on fabric paint. This was tested on copper coloured chiffon using a turquoise coloured paint. The burnout samples were made using a random pattern. However, it was very difficult to produce this design effect without scorching the silk velvet and leaving a hole.

February 09: The burn out sample is very effective, several really big zig zag shapes looked like a shadow.

These ideas led to a series of eight sketches that incorporated sprayed discharge on black velvet, burnout on black velvet, and fabric painting on chiffon (Figures 18-20).

February 09: I like the cylindrical collars that seem to engulf the head... the burnout skirt would be unlined to further the effect of shadowing and give glimpses of layers (legs) beneath... the ideas for using the painted fabrics tend to look too "homemade", they don't convey the elements of the outdoor sculpture.

After evaluating all the techniques and ideas, I decided to make a prototype garment: the cylindrical collar top with the pintuck top underneath and the burnout velvet skirt. To help decide fabric colours, the sketch was coloured, using Adobe Photoshop® computer software program (Figure 21). With this program I could easily change the colours of the sketch based on alternatives about whether the cylindrical top should be gold, grey or copper. Initially, I coloured the sketch so that the cylindrical top was gold and the pintuck top was copper. However, when I fabric shopped, I purchased grey dupioni silk instead of gold. The gray fabric was a reasonable price and appeared to be the perfect tonal choice under the store's lights. However, in the daylight it turned out to have lavender undertones which then made it difficult to match to an appropriate chiffon.

February 12: I realized that the grey dupioni silk went well with some black silk organza that I already had. Now, I will have to make one of my computer drawings in the colour of the prototype (Figure 22).

The construction of the two prototype garments was a welcome change from the abstract conceptualization and moved forward in the tracking of the design process. But, as this was a non-linear process, ideas did jump backward and forward.

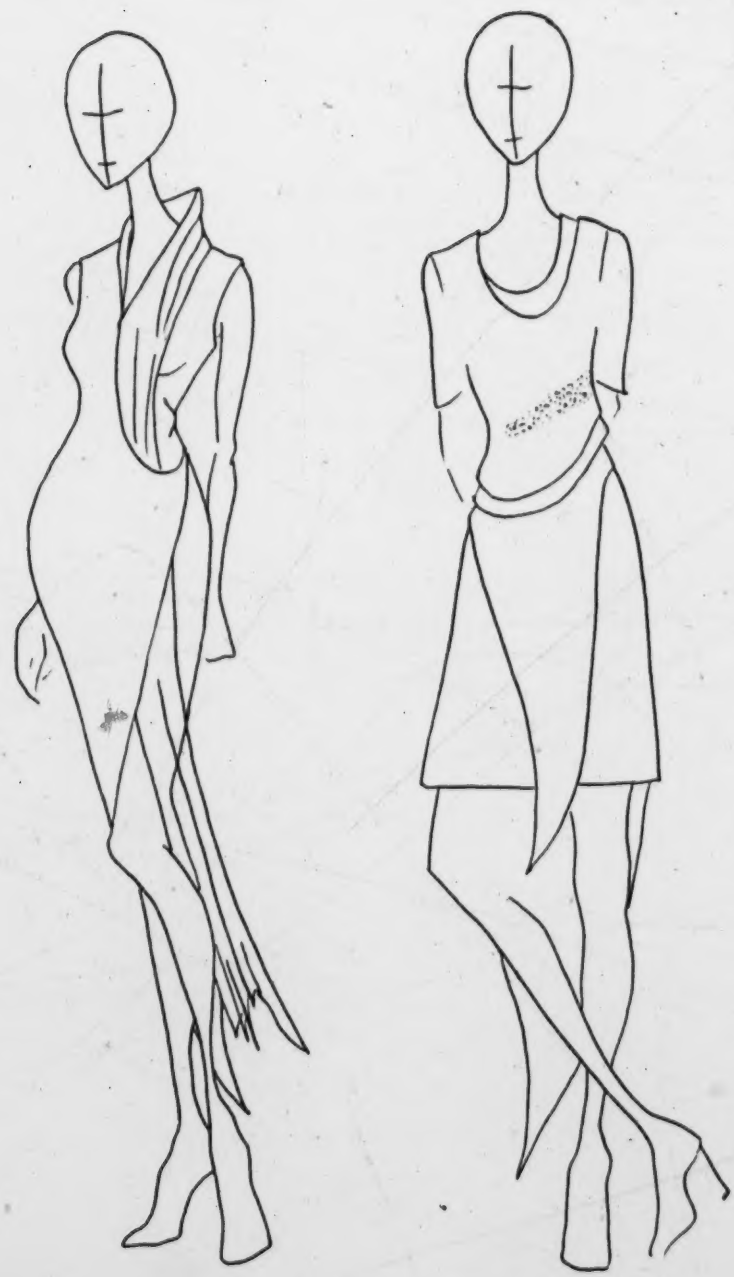

Figure 18. Sketches illustrating ideas of burnout and oxidation (by discharge solution).

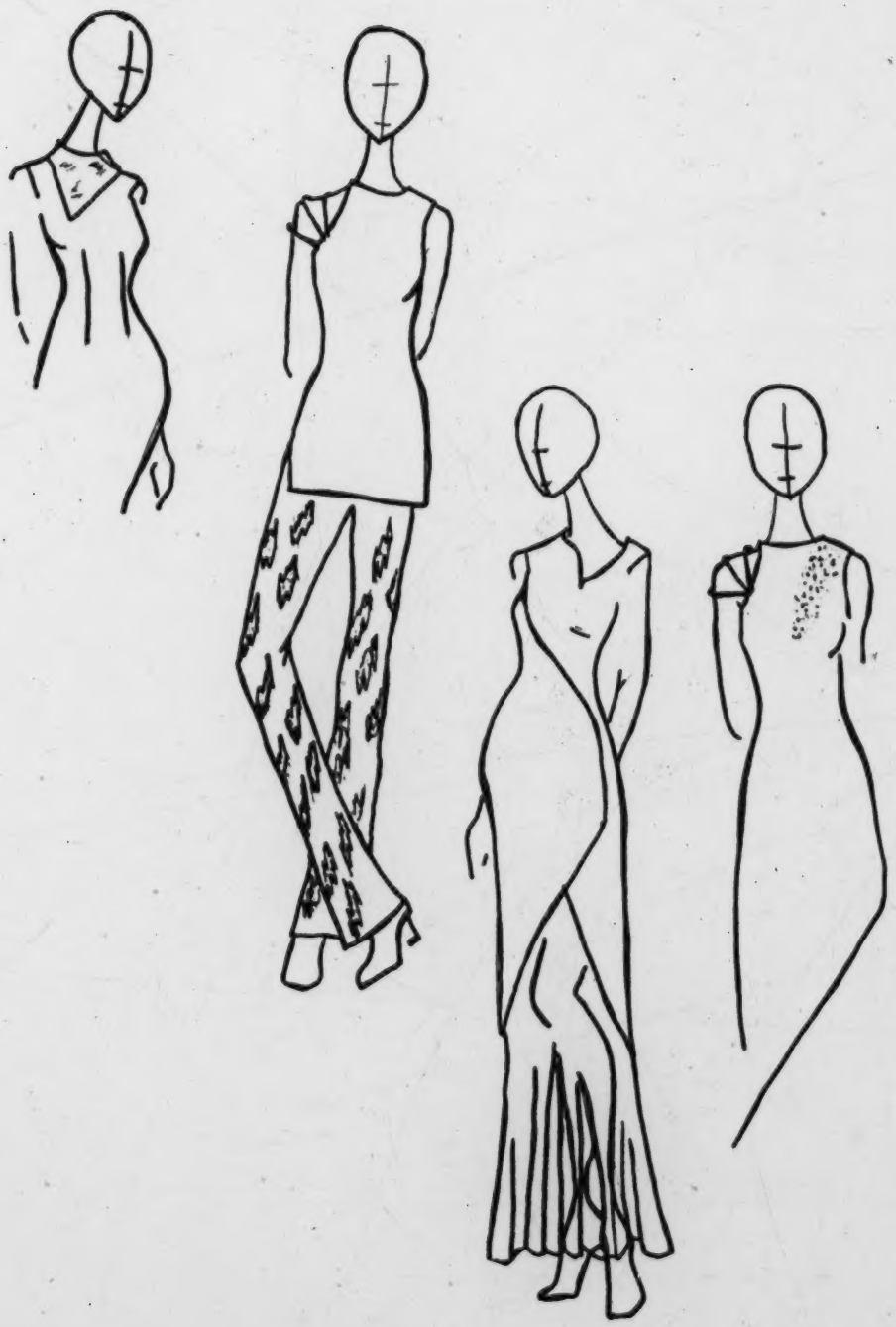

Figure 19. Sketches illustrating ideas of oxidation of metal using fabric painting on chiffon and dye discharge on black velvet.

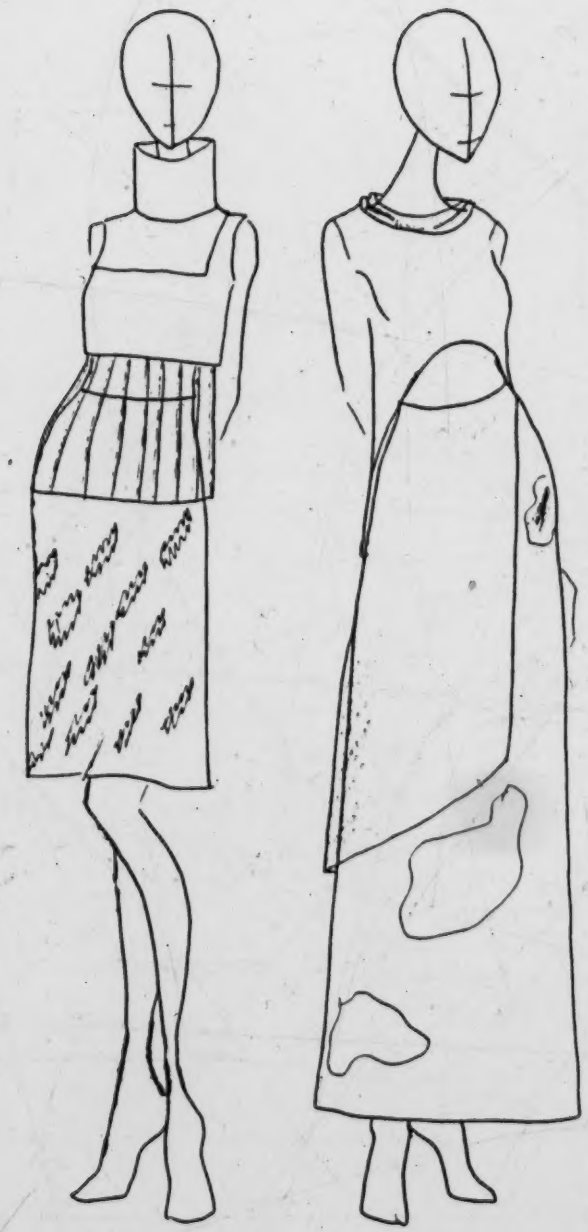

Figure 20. Sketches illustrating ideas of raised surfaces through pintucks, burnout of napped fabric and fabric painting to show oxidation.

Figure 21. Computer sketch illustrating gold cylindrical top.

Figure 22. Computer sketch illustrating silver cylindrical top.

February 19: I need to try to focus harder because all the distractions are getting in the way of the creative process or maybe it is just harder to identify the stages that are occurring. I am enjoying the garment construction, it gives a sense of clarity of purpose... Although I like the garments I am taking to the prototype stage, I still feel they lack the essence of what I am trying to capture... The book that Curtiss got me " Modern Sculpture" by Herbert Read is a great resource and inspiration. It is interesting to live in postmodern times while reflecting on the art movement of modernity.
February 23: I started working back at the beginning with idea generation using pictures from the Modern Sculpture book by Herbert Read. I photocopied Ptolemy I by Jean Arp, Shell and Head by Jean Arp, Bird in Space by Constantin Brancusi and Internal and External Forms by Henry Moore (Figure 23). I worked with Jean Arp's Ptolemy I in PhotoShop Delux 1.0 ® by adding distortion, colour, wind and by making it look like a sketch (Figure 24).

I then worked back and forth between constructing the prototypes and sketching new designs. This allowed me to get a greater sense of the "hands-on" approach and, perhaps, because I was busy constructing garments, it allowed contemplation time for unforced train of thought.

February 26: I had some thoughts on relating my creative process in garment design to the models of such processes. Each garment process is different, sometimes the idea flows easily, other times it is much more reluctant. In other words, sometimes there is a strong feeling of the creative breakthrough, and these are the designs that I have confidence in ... I immediately know that they are the first sparks of exactly the idea I want to communicate. For other designs the process is slower, more thinking and evaluation is involved. In these cases, there isn't the immediate feeling of passion that occurs with others. I wonder if this relates to the difference between the intellectual versus the intuitive parts of the creative thinking process. From these ideas I can relate that I have more confidence in the intuitive side... I feel more motivated to explore the designs that result from that flash of insight. I became aware of this because of my meeting with Linda this week. I brought in the Modern Sculpture book and I was showing Linda the pieces I especially liked and had photocopied. When I first got the book, I immediately identified with Ptolemy I by Jean Arp and Interior and Exterior Forms by Henry Moore. I was discussing with Linda about the Moore sculpture and the description of why I liked it when I had a creative breakthrough-the idea of a soft sculpture jacket or

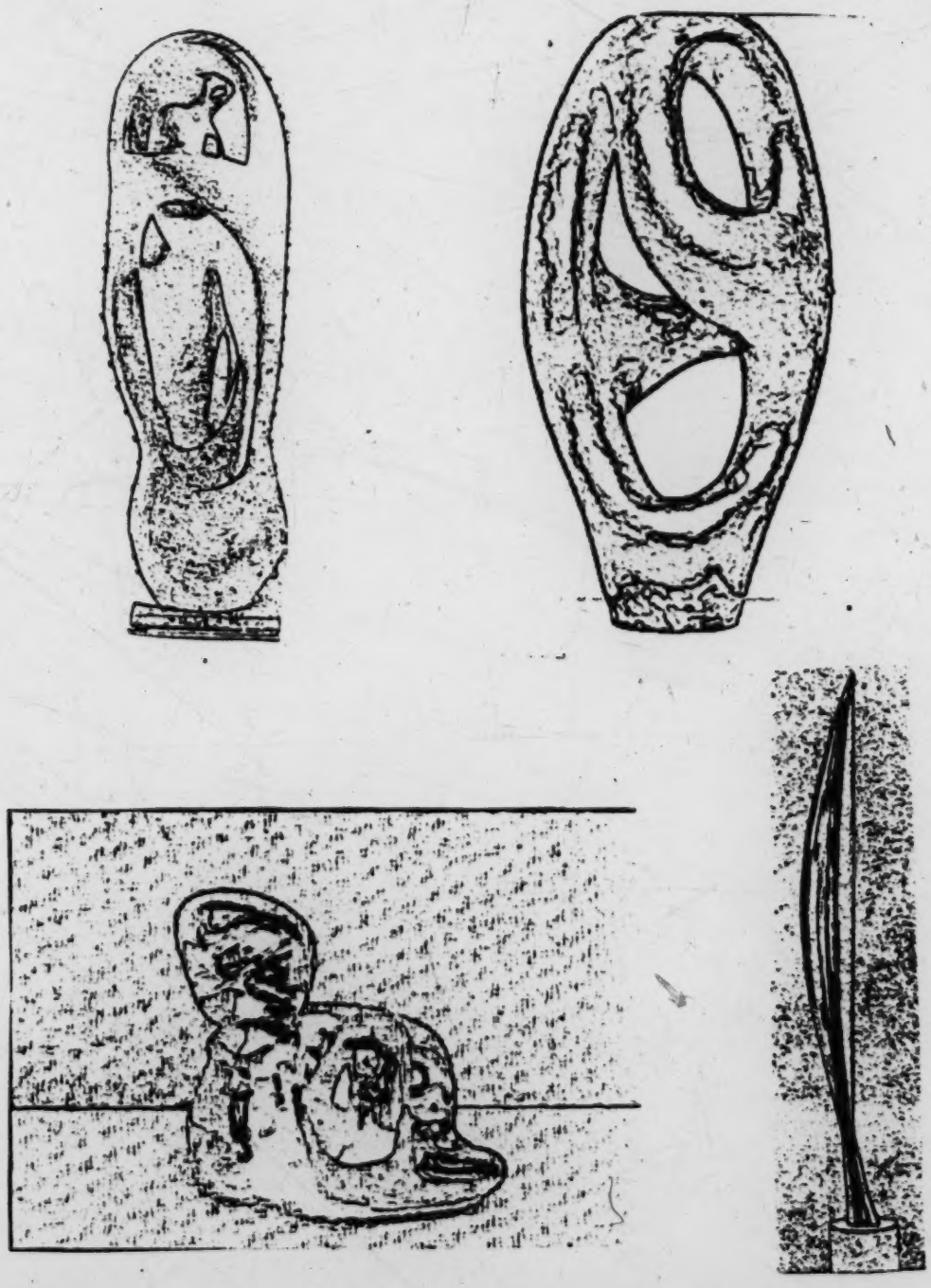

Figure 23. (Clockwise from top left) "Internal and External Forms" by Henry Moore, "Ptolemy I" by Jean Arp, "Bird in Space" by Constantin Brancusi and "Shell and Head" by Jean Arp. Note. From Modern Sculpture: a Concise History, by H. Read, 1989, Thames & Hudson, pp. 164, 53, 132, 56 (respectively).

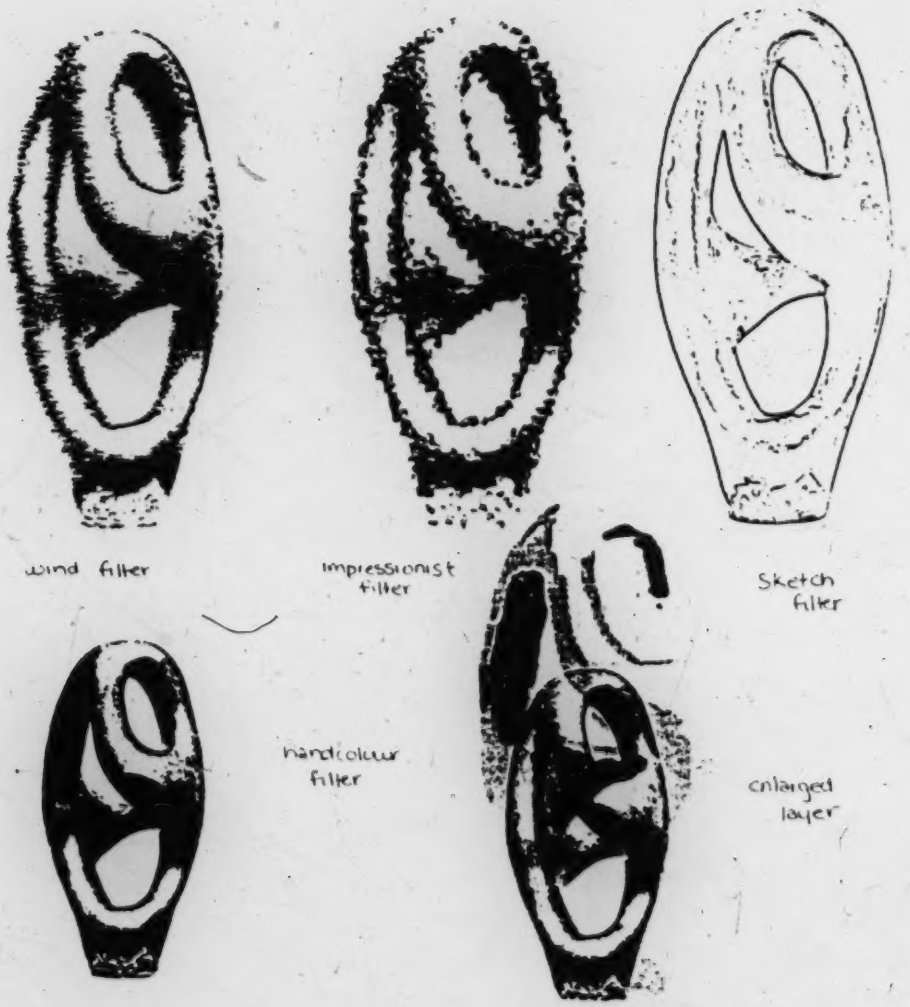

Figure 24. Computer adaption of Jeán Arp's "Ptolemy I". Note. Adapted from Modern Sculpture: a Concise History by H. Read, 1989, Thames & Hudson, p. 53.

shell that would fit over the other pieces in the line. I haven't even done any sketches, but I have a firm idea of how the garment "sculpture" should look, with the hood enclosing around the face and head, but rounded out from the crown. The arms would be like tubes that meet at center front with a muff, to cover and enclose the hands. There would not be a formal bodice in the front, so the sleeves would start from nothing and be attached to the back bodice. Above the knee level in the front would be another tube-like enclosure similar to the arms, but would be wider and one-piece. All of these ideas occurred at an alarming rate in succession, or maybe all at the same time. Then I thought about fabrics- maybe grey silk velvet or copper dupinoni silk. Sketches will help to visualize a prototype garment.

The pictures led to ideas of curving burnout patterns, relating interior and exterior space to the three dimensional form of the body. Figures 25 and 26 illustrate the visualization progression of ideas and the development of garment form from a sculptural piece.

March 06: I had some ideas for the development of the line. I may not make all the pieces, but I would like to have illustrations of them. The bib and pintuck top were originally illustrated with a shadow burnout skirt, however, a cone shaped skirt would also work with the garments. On Wednesday I was helping to set up a display with an 1850s-1860s dress from the collection and it required a cage crinoline replica. The structure of that replica, with the steel encased in the skirt, has really left an impression on me. I think I should work with that idea.

The sketches and reflection on my experiential knowledge led to a final decision for the theme of the line. It was difficult to limit the line to nine pieces, but I was anxious and knew I still had all the prototype development to complete.

March 09: I am gaining confidence in past designs, they are coming together with the introduction and refinement of fabric choices. I have decided to design around two sculptural sub-themes: shadow and structure. The fabrics will unify the designs through sheen and colour and the styles will centre on high tube-like collars, floaty shadows and highly shaped angles and curves (see figures 27 to 29)

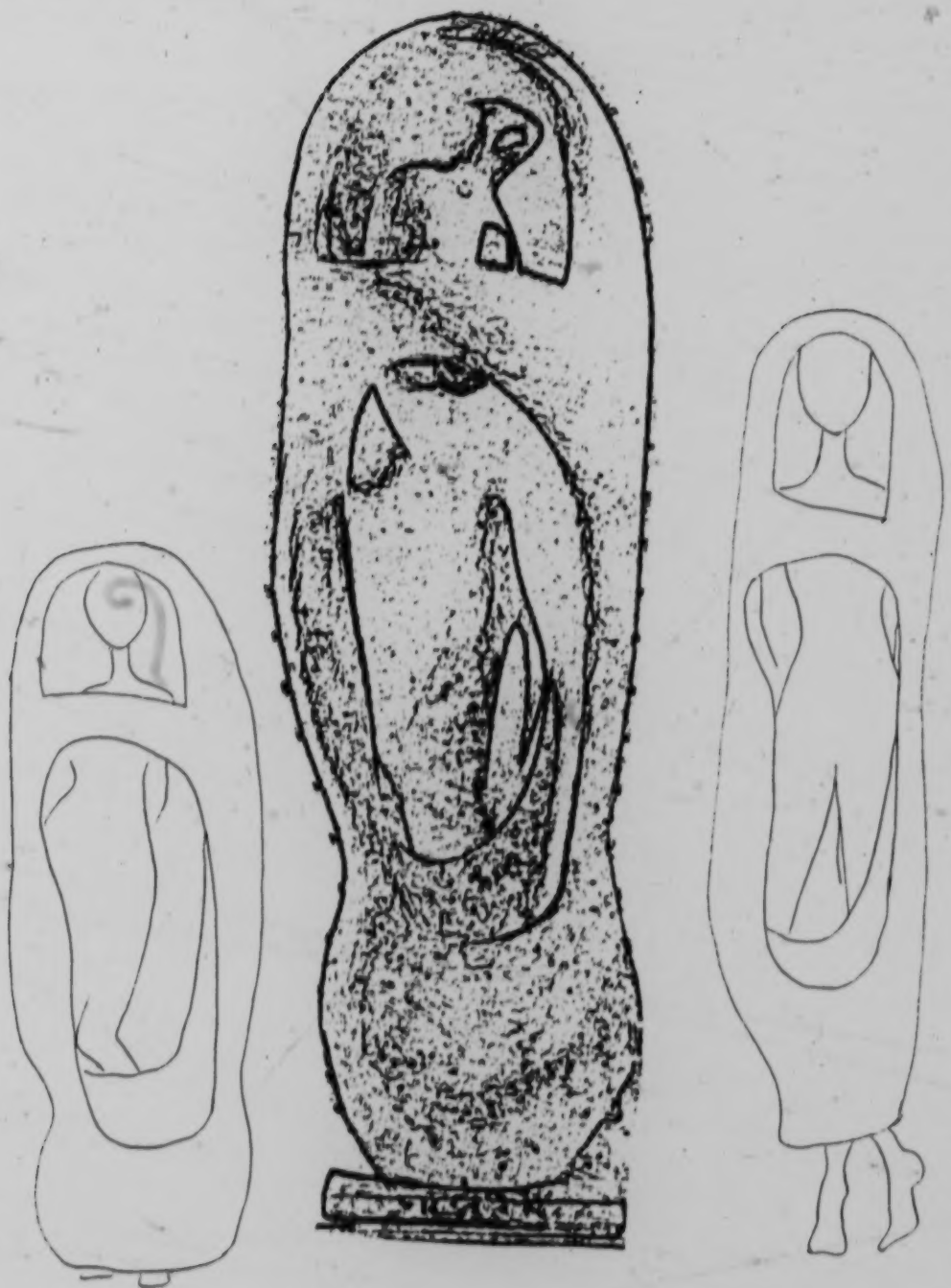

Figure 25. The development of a garment interpretation of Henry Moore's "Internal and External Forms".

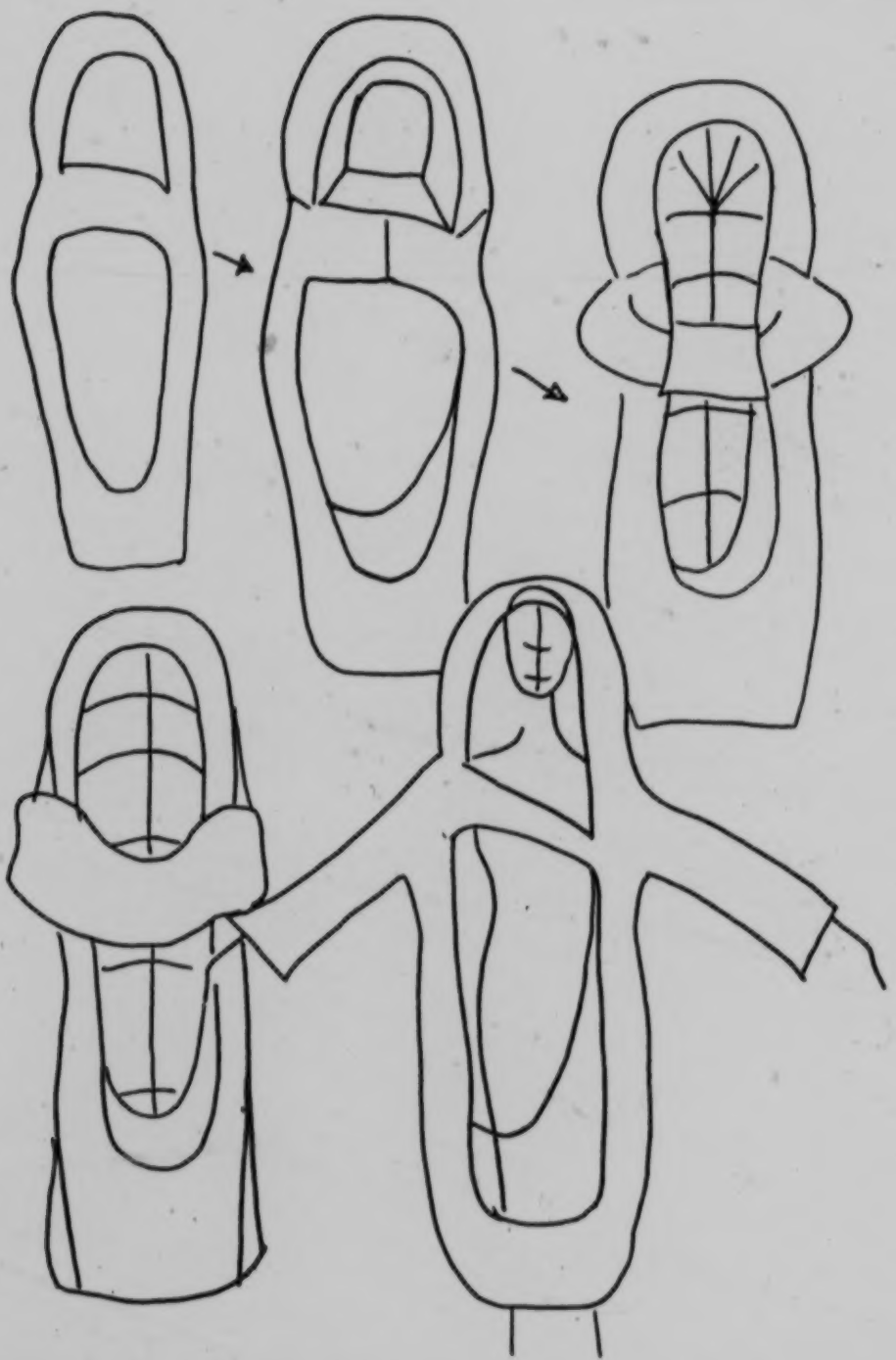

Figure 26. A visualization exercise relating the sculptural idea to the human form.

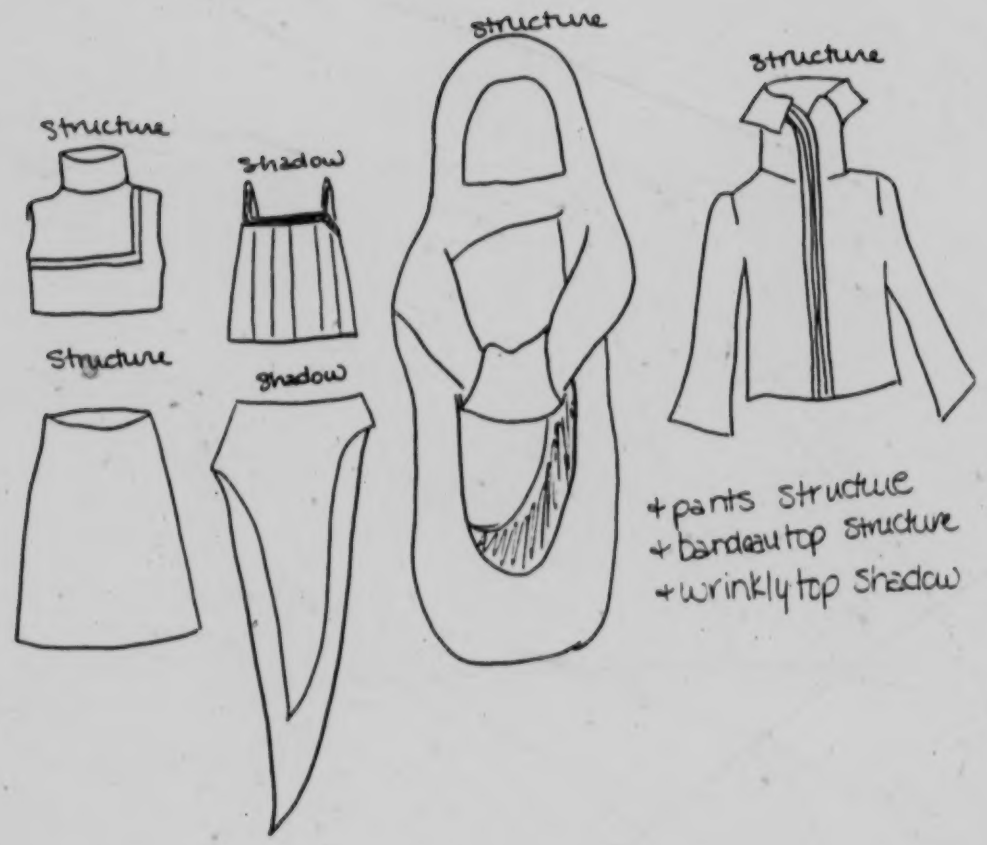

Figure 27. Basic line drawings of some of the garments that are categorized into one of the sub-themes, structure or shadow.

Figure 28. Initial sketches of the pieces of the line of garments.

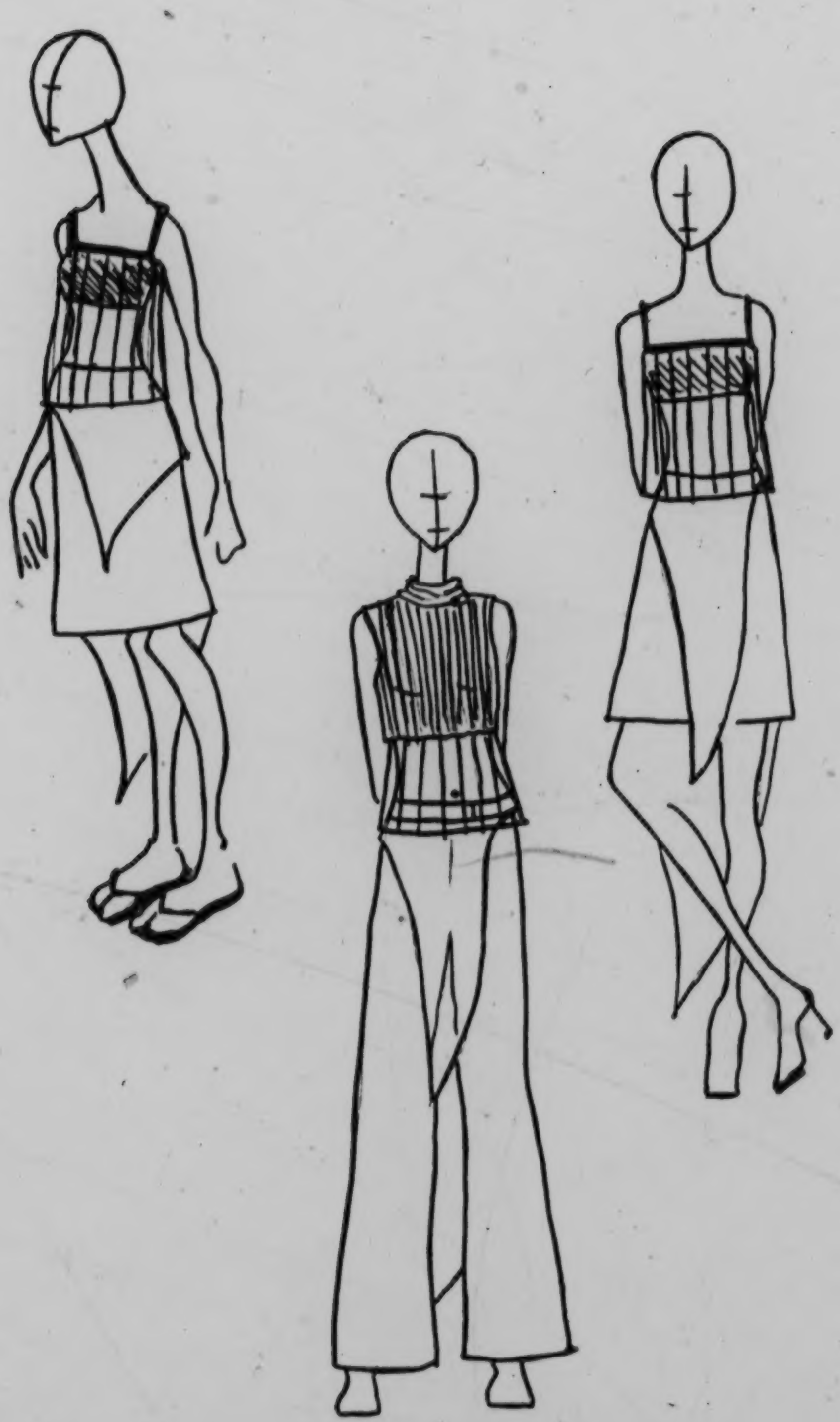

Figure 29. Additional sketches of the 'mix-and-match' separates.

Experimentation and Refinement

Figures 30 to 33 illustrate the coloured sketches from which the prototypes were based. The patterns where drafted either by hand or by using AutoCAD® and muslin fitting shells were made to test the design and construction aspects of the garments. The construction of the prototypes and the decisions made during this part of the process were based entirely on my experiential knowledge. Very few details of the designs were changed from the colour illustrations, in fact, more often I had to expand from these sketches because some elements were not included in the sketches. For example, I had to decide on garment closures and hem styles. All of these decisions where made very quickly based on other experiences with garment construction. One-tenth scale patterns of the garments designed on AutoCAD® are located in Appendix A.

Figure 30. Colour illustration of "mix-and-match" pieces. The figure on the left shows the roll-collar jacket, the apron and the cone skirt. The figure on the right shows the wrinkly top, the pintuck top and the wide leg pants.

Figure 31. Colour illustration of "mix-and-match" pieces. The figure on the left shows the bib top, the pintuck top and the wide leg pants. The central figure shows the wrinkly top, the cone skirt and the muff (from the shell). The figure on the right shows the bandeau top, the cone skirt and the shell.

Figure 32. Colour illustration of "mix-and-match" pieces. The figure on the left shows the pintuck top, the roll-collar jacket, the apron and the wide leg pants. The figure on the right shows the shell.

Figure 33. Colour illustration of "mix-and-match" pieces. The figure on the left shows the bib top and the wide leg pants. The figure on the right shows the pintuck top (with the bandeau top underneath), the cone skirt and the muff (from the shell).

The Pieces/Prototypes

The final line consists of nine garments which reflect either structure and/or shadow. The sub-themes of structure and shadow are emphasized by the cut and the construction of the garments. For the "structure" pieces it was important to maintain a sense of rigidity and smooth angles. Whereas, for the "shadow" pieces it was important to suggest movement and a soft, cool feeling, like being in the shade. The pieces are: the bib top, the pintuck top, the cone skirt, the bandeau top, the wrinkly top, the apron, the wide leg pants, the roll-collar jacket and the shell. Each of the pieces will be discussed in relation to how they reflect the sub-themes and how their construction contributed to the design elements.

A. The bib top

The bib top (Plate 1) is in the "structure" category in the line of garments. It is a stiff boxy-styled bodice with a stand-up cylindrical collar. The piece shows rigidity through its angular lines and construction techniques. The bib and collar are stiffly interfaced to give more weight to the fabric. The fabric choice of gray dupioni silk reflects the use of materials that give the impression of roughly hewn metals, whereas, the black silk organza is sheer yet crisp as an inserted shadow under the bib.

B. The pintuck top

The pintuck top (Plate 2) is a "shadow" piece in the line of garments. It is made of black silk organza that reflects the sheerness of a shadow versus its crisp hand. The pintucks create a raised parallel surface, visually lengthening the body in contrast to the garment's boxy shape. The garment is cut with the hem on the selvage of the fabric to ensure that it does not have to be hemmed, therefore, eliminating a hem's additional visual weight.

C. The cone skirt

The cone skirt (Plate 3) falls into the "structure" category of the line of garments. The rigid a-line shape is emphasized by the use of a slate coloured silk taffeta. The unusual colour of the fabric reflects the changes in tone that occur with the reflection of light on the surface of the object.

D. The bandeau top

The bandeau top (Plate 4) is also a "structure" piece. It is a foundation garment that tightly encases the body. It is made of a nylon/spandex blend, but it is cut to constrict rather than stretch on the body of the wearer. The sparkling grey colour is meant to

Plate 1. The bib top. (Photo credit R. Siemens, 1998).

Plate 2. The pintuck top. (Photo credit R. Siemens, 1998).

Plate 3. The cone skirt. (Photo credit R. Siemens, 1998).

Plate 4. The bandeau top. (Photo credit R. Siemens, 1998).

disappear underneath the other pieces.

E. The wrinkly top

The wrinkly top (Plate 5) is a "shadow" piece within the line of garments. The draped light bodice allows the metallic tissue fabric to fall lightly over the wearer. It is the fabric's inherent qualities that reflect the theme. The fabric is 72% metal threads and it glistens and reflects light in the same manner as an outdoor sculpture. However, the disproportional weight of the metal threads, in combination with the 18% silk yarns, causes the fabric to crease, resulting in multiple raised and recessed ridges. The bodice does not have a hem, rather the piece is allowed to naturally fray giving a sense of the blurred lines of a shadow.

F. The apron

The apron (Plate 6) is a piece within the "shadow" category of the line of garments. It is the softest piece in the line of garments made of 100% polyester chiffon. The fabric is airy, allowing for movement, and has a multi-coloured pattern of muted greys and blues. The construction techniques ensured that little additional weight was added to the garment. As such, the garment has a rolled hem and a bias binding waist application. The piece is worn over either the cone skirt or the wide leg pants giving a shadow effect to each of these pieces.

G. The wide leg pants

The wide leg pants (Plate 7) are a "structure" piece. They are made of a grey silk twill. The fabric drapes heavily and is cut to accommodate slight curves, but overall maintains a linear quality. The pants have a flat front and sit low on the hips, therefore, de-emphasizing the curves of the wearer.

H. The roll-collar jacket

The roll-collar jacket (Plate 8) is a "structure" piece. Made of a granite coloured silk taffeta that is fully interfaced to give additional body. The lines of the garment are sleek, but angular with a center-front zipper and parallel top stitching that elongates the body of the wearer. The collar can fully incase the wearer's head or it can be rolled down slightly, casting a shadow on the wearer's shoulders. The collar can also be fully folded down creating heavy angled lines on the surface.

I. The shell

The shell (Plates 9 & 10) is a "structure" piece. It is made of the same slate coloured fabric as the cone skirt, but the shell is heavily interfaced, underlined and padded for additional

Plate 5. The wrinkly top. (Photo credit R. Siemens, 1998).

Plate 6. The apron. (Photo credit R. Siemens, 1998).

Plate 7. The wide leg pants. (Photo credit R. Siemens, 1998).

Plate 8. The roll-collar jacket. (Photo credit R. Siemens, 1998).

Plate 9. The shell. (Photo credit R. Siemens, 1998).

Plate 10. Close-up view of the shell. (Photo credit R. Siemens, 1998).

body and structure. This is the most conceptual piece in the line as it is to be worn over the other pieces. It is a sculpture over structure and shadow. The large hood can fully engulf the wearer or allow slight glimpses, however, in either case the wearer becomes secondary to the shell. The muff is used to encase the hands making the sleeves continuous, resulting in a form that encloses space horizontally and vertically.

Critique

As previously discussed, evaluation is a central component to each of the stages during the process of creative apparel design. As this experience will contribute to my experiential knowledge, reflection on the exploration and outcome of the process will help to clarify the learning experience encountered. Overall, I am very pleased with the outcome of this line of garments. I feel that I have successfully illustrated the impression of outdoor sculpture through the use of sub-themes: structure and shadow.

The collection of garments can be considered successful because of the design principles 'unity' and 'emphasis'. The line of the garments is unified by fabric choices, fabric colours and the garments silhouettes. The fabrics have a high sheen and give the impression of metallic elements made of either roughly or smoothly hewn materials. The dupioni silk and the silk twill provide an unpolished look because of the slubs in the yarn. The silk organza and silk taffeta have a very smooth and luminescent surface because of the finely twisted yarns. The colour choice was monochromatic, from black to light grey. The silhouettes of the garments are angular with strong edges that leave a tubular impression. Emphasis is expressed through design details such as top stitching, pintucking, rolled hems and fabric inserts.

The bib top is thematically and stylistically appropriate, but the fabric colour choice is not very effective. It is the only piece in the line with lavender coloured undertones and it would be much more effective if it was a slate coloured dupioni silk. Due to the different tone of the bib top it cannot be worn with the cone skirt, limiting its potential as a "mix and match" garment.

The wrinkly top is a very effective piece in its cut and reflection of its sub-theme, shadow. However, the fabric causes problems during construction. The wrinkles in the fabric stretch as the seams are stitched, changing the shape of the pattern. The amount it stretches is difficult to accommodate and it is hard to predict the new shape as it is being stitched. Therefore, during construction the shoulder seam stretched making it wider than planned, causing the armscye to droop. The side seams were taken in to

adjust for the armscye gape and the new stitching line is too high, resulting in a tight armhole. The use of this fabric in mass production would require additional planning and pattern alteration. As the creative design process is an endless evolution of ideas within the thinker/designer if this line of prototypes were developed for mass marketing a few alterations would have to be made.

Chapter 5
The Conceptual Model

An important objective of this thesis was to develop a conceptual model of the creative design process. As previously discussed, current conceptual models either illustrate the creative thinking process or the development of a creative product, after an idea has been decided on. Therefore, a new conceptual model must take into account the thinking and action elements, encountered during the process, that previous models overlooked. The model must include generalizable criteria, including: the designer's individuality; the creative thinking process; multiple modes of thought, such as intuition and intellect (Udall, 1996), and the stages of prototype development.

The visual representation of the model is given credibility by the newly emerging paradigm, chaos theory, and its adaption to the social sciences. Chaos theory is also refered to as nonlinear dynamics and it deals with research issues about the complexities of human nature (Patton, 1990). Specifically, it allows for descriptions of disorderly phenomena, that have underlying order (Cronbach, 1988), without forcing it into static patterns (Patton). "Chaos theory challenges us to deal with unpredictability and indeterminism in human behavior" (Patton, 1990, 84).

The process

The model developed is a direct result of the creative thinking and design process that occurred during the development of the line of garments inspired by outdoor sculpture. The steps described are the result of documentation of this process and then are generalized into a model format that may be used to describe further creative design processes. The steps described are not necessarily sequential, rather, they occur in variable patterns that may change with each subsequent process. However, the use of the terms step or stage, to describe components of the process, suggests a linear not a capricious pattern. To eliminate the confusion, and more clearly describe the potential for variables within the process, the components of the process will be referred to as elements.

An integral element to this process, that is not addressed by other models, is the involvement, influence and control of the process by the **thinker/designer**. Everything involved in the process is dependant upon the thinker and his or her experiential knowledge. The thinker brings the background and point of view that frames the entire

process. Acknowledging the role of the thinker within the process makes it unique and individualized.

Another integral element to the process is identifying the **customer profile**. By targeting the creative product, the designer can identify the audience, the needs to be met and the purchaser of the end product. Developing the customer profile defines the end user of the product and creates a frame of reference for the entire process.

Trigger mechanisms often are the initial spark for the apparel design process. External stimuli are absorbed and processed by the thinker/designer in relation to his/her experiential knowledge. The trigger begins in the intuitive mode of thought as the thinker/designer may not actually be conscious of their response to the stimuli. The resulting idea, or series of ideas, are referred to as the trigger mechanism and it initiates the exploration of the creative apparel design process.

Gathering information is an element in the process that involves the collection of external stimuli relating to the idea generated by the trigger mechanism. Awareness of the trigger mechanism indicates a move into the intelligence mode of thought, by the thinker/designer, as he/she actively explores the problem. This awareness does not necessarily translate into vocalizing the way they are addressing the problem, rather, they can identify an increased interest in some aspect they are exploring. This element is very dynamic as the thinker/designer develops a heightened awareness of a specific interest. Gathering information is very individualistic and may involve the collection of things of interest including: photos, fabrics, magazine clippings, or poems. Inherent evaluation occurs as the designer decides what information relates to the trigger (as they see it) and what relates to their experiential knowledge.

Another element in the process is **Discovery**. This involves an exploration of the ideas generated by the trigger mechanism on an intellectual level of thought. Sketches, collage-making and brainstorming are all means of exploring the ideas developed. Ideas become more firm or tactile as the designer tries to translate the idea from the three dimensional image in the mind to a two dimensional image on paper. At this point, the idea takes shape outside of the creator's mind. Evaluation occurs as a natural component during this process and the thinker/designer makes decisions quickly based on experiential knowledge.

The **creative breakthrough** is an intuition-level activity. The trigger mechanism coupled with the designer's experiential knowledge results in the creation of an intriguing idea for the product. The idea continues to evolve throughout the process, but this is its

conception. Evaluation occurs as the thinker/designer discards ideas that will not work or ideas that do not have the necessary level of expression. Most apparel design models, to date, begin at this point.

Production and development are also integral to creating products. Experimentation begins the stages of production, on an intuitive and intelligence level. The thinker/designer works through the idea(s) for the creative product by sketching, making a colour storyboard, searching for supplies and by working with the logistics and feasibility aspects of the production. This element may also include pattern drafting and small sample production. Evaluation is also a key part of this stage. Decisions are made quickly based on experiential knowledge. Refinement occurs as the design is fine-tuned. In a mainly intelligence level activity, the creative product is evaluated and altered based on feasibility, the initial idea and logistics of production. The final element is the development of the creative product or prototype. The creative product and the process involved becomes a part of the thinker/designer's experiential knowledge and will influence subsequent creative design processes.

The model of the process

The creative design model is illustrated to incorporate all the elements of the creative apparel design process. The result is a complex three-dimensional model that illustrates the dynamic nature of the creative apparel design process including the elements of the process, the twists or gateways between intellectual and intuitive modes of thought, while incorporating aspects from apparel design and creative thinking process models. All of these components are central to the thinker/designer.

At the center of the model, and the driving force, is a ball representing the thinker/designer (Figure 34). This ball represents all the influences that make the process individualized, including the designer's experiential knowledge. Trigger mechanisms develop within the ball as external stimuli is related to the thinker/designer's experiential knowledge, resulting in an idea that is a catalyst for the process.

Emerging from and entering into the model of the thinker/designer are tubes that carry external stimuli (Figure 35). These tubes are representative of the customer profile and the external stimuli that sparks the trigger mechanism. These elements of the process are illustrated by tubes because they physically emerge from outside of the thinker/designer, but they are also corridors into the thinker/designer's creative thinking process. The tubes are three dimensional, allowing for ideas to travel between

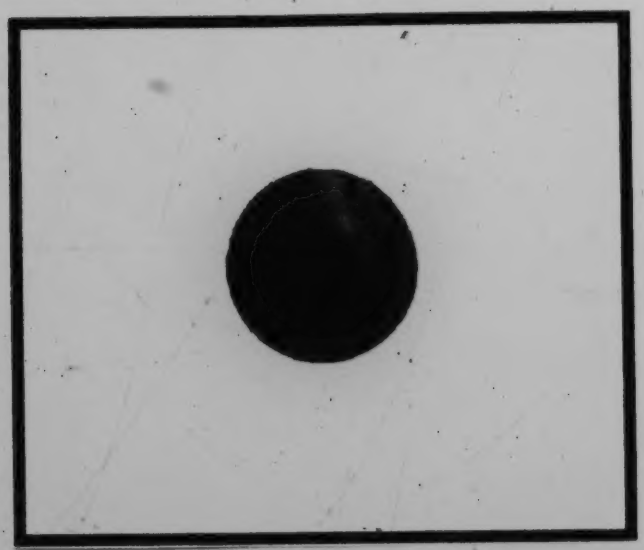

Figure 34. The three dimensional ball represents the thinker/designer central to the evolution of the process and development of a creative product.

Figure 35. The tubes represent the access paths into and out of the thinker/designer.

intellectual and intuitive modes of thought, and on-going evaluation to occur as ideas and information flows into and out of the thinker/designer. The use of four tubes is not significant, there could be more for some processes and fewer for others, they merely account for access paths into and out of the thinker/designer.

The tubes extrude from the thinker/designer model to form a scaffold-like structure representing the elements encountered during the process; gathering information, discovery, creative breakthrough and experimentation/refinement (Figure 36). The scaffolding structure represents the influence and dynamic interface between elements of the process. The trigger mechanism evolves through a series of complex actions, while relating to the decisions being made by the thinker/designer. Like the Möbius ring (Udall, 1996), the scaffolding structure is illustrated to represent two modes of thought, intellegence and intuition. The modes of thought are represented by the sides of the tube, one mode would be on the top and the other mode on the underside, with the gateway between the modes of thought represented by the intersections of the tubes. The scaffolding is a type of tubular highway that the trigger mechanism travels, switching between intellectual and intuitive modes of thought, and allowing for different elements to inter-relate at anytime during the process. For example, the thinker/designer may gather information relating to the trigger mechanism and then begin to sketch a series of garments. However, the search for a specific type of fabric may require an adaptation of what was initially anticipated. This in turn, leads to more sketching and then to small sample production.

The final component of the model is a translucent sphere that surrounds the whole process and represents the creative product outcome (Figure 37). The scaffold or interaction between the stages emerges from the sphere, but is also contained by it. This illustration depicts how the process extends beyond the creative product and, for some designers, the stages and passion for the process is the main focus of the exploration, rather than the creative product development.

To ensure the conceptualization of the model, the tubes or elements are not labelled. Each time the thinker/designer enters the creative design process he/she may encounter these elements, but in an unpredictable order. This potential for variables allows for several explorations of the same stage within one process, therefore, making each exploration of the creative design process unique.

Overall, the model represents how the process is an internal and external part of the thinker/designer. An idea can occur in the designer's mind, be externalized through

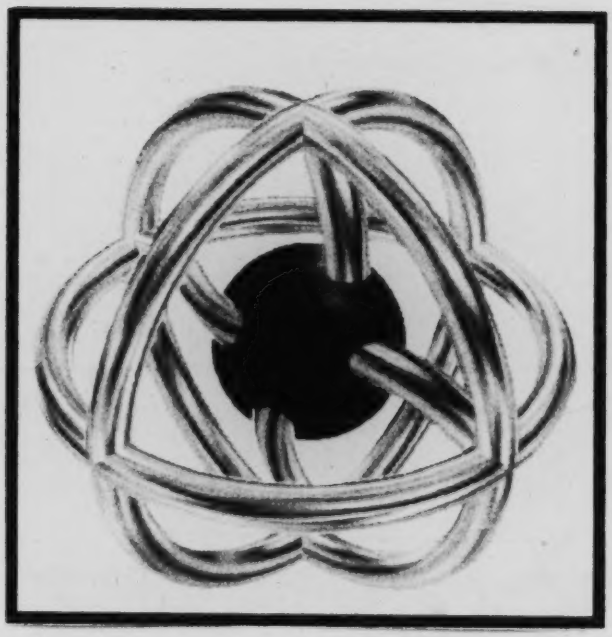

Figure 36. The tubes extend beyond the thinker/designer to form a scaffolding-like structure illustrating the interface between the elements of the process (including: gathering information, discovery, creative breakthrough and experimentation/refinement).

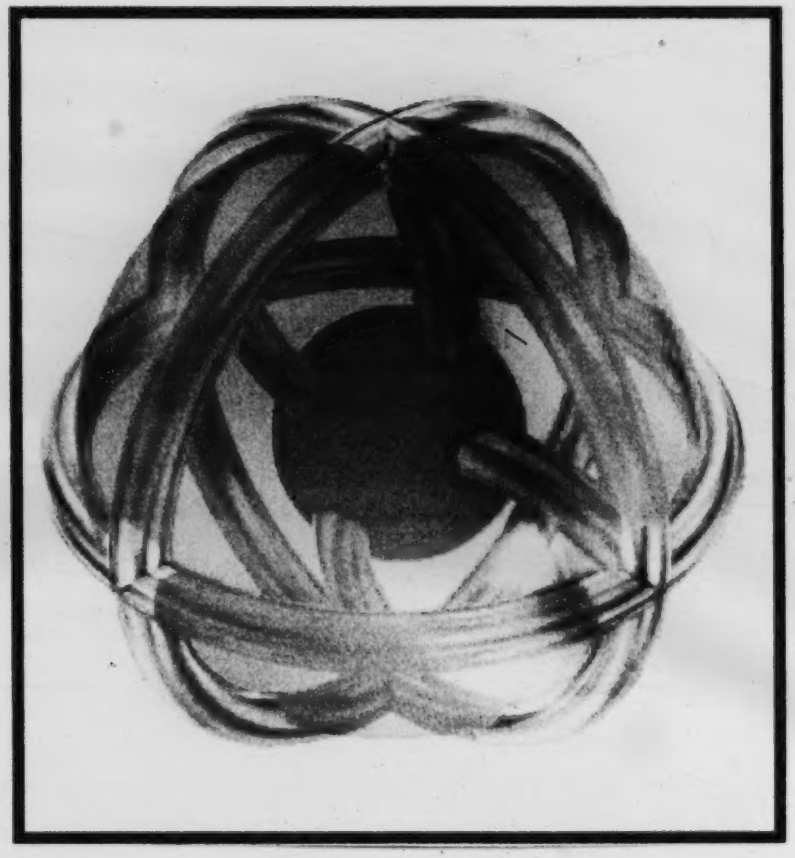

Figure 37. The creative apparel design process model. The translucent sphere depicts the creative product.

sketching and then made tactile in the form of a creative product. External stimuli can flow from the near environment into the thinker/designer, act as a trigger mechanism for the designer and then re-emerge as a creative product. The final product can then influence the thinker/designer again or be external stimuli to another designer.

Chapter 6
Summary and Conclusions

Summary

The purpose of this study was to document the thinking and action components of the creative apparel design process to gain a better understanding of the process and to develop a generalizable model. Descriptions of the content and process components of the designers' actions and decisions during the creative apparel design process leads to a greater understanding of the process as experienced by designers (Dorst & Dijkhuis, 1995). A two step process was followed including documentation of the development of a line of garments, from conception to completion, and the development of a conceptual model of the creative apparel design process. As a designer, I drew upon my experiential knowledge and searched for external stimuli to trigger inspiration. The documentation and reflection on these actions comprise a large proportion of this study.

During the initial stages of my research I explored previously published conceptual models relating to the creative thinking process and the design process, respectively. These models illustrated how creative thinking and design process models are continuously evolving. Yet, there remained a need for a model that illustrates the integration between the creative thinking process and the design process. The documentation of the process of designing a line of garments was used to develop a conceptual model to illustrate the thinking and action stages of the process, as well as the thinker/designer's direct involvement and influence.

The designing of the line of garments was initiated by my search for a trigger mechanism to inspire the design, while reflecting on and documenting my actions and thought processes. Being self-aware of activities that normally occur sub-consciously requires clarity of thought. Initially, it was difficult to do this. However, I began to realize that as I design, I normally store information in my head that I now must externalize. In effect, I was making components of my apparel design processes visible and documenting stimuli that were not necessarily comprehensible to others.

Following the identification of a trigger mechanism, outdoor sculpture, I worked with idea-generating activities, gathered visual reference materials, sketched preliminary ideas and finally decided on criteria for my line of garments. I decided to work with the sub-themes of structure and shadow. I then designed the pieces of the line as interchangeable separates to fit into the themes. I chose fabrics to reflect elements of

metallic materials and used interfacing and the garment cut to maintain the thematic elements. The resulting designs culminated in the production of nine "mix and match" pieces.

The documentation of the creative apparel design process was then used to develop a conceptual model of the process. The development of the model was complex as it needed to transform abstract concepts into an understandable form. Aspects of the process that needed to be included in the model were the dynamic and sometimes random nature of the process, how ideas travel between intellectual and intuitive modes of thought, and the influence of external stimuli upon the thinker/designer. Most importantly, the model needed to account for the uniqueness of any thinker/designer, as well as, the recognition of evalutation as integral to each element of the process. The resulting model is unlike previous conceptual models of the apparel design process as it focuses on the integral role of the thinker/designer rather than on the outcome of the process, the product. This focus on the thinker/designer and his/her experiential knowledge is the essential component to the generalization of the conceptual model of the creative apparel design process.

Preparing the Line for Marketing

Another objective of this research was to develop a line of clothing while documenting the creative apparel design process. This line of garments was designed to be appropriate for exhibition purposes, however, it could also be adapted for mass production. However, at this point the line produced is not entirely suitable for mass production. Several pieces are "one-of-a-kind" and would be sold in boutique shops or be used in runway presentations for advertising purposes. The launch of the line of garments onto the mass market would require some additional preparation, refinement as well as re-design of some of the pieces. All of the garments would require a cost analysis to determine materials, labour, marketing and overhead costs as well as a critical analysis to identify the pieces that would meet target market requirements. Based on a cost analysis, some of the pieces may need refinement in design and production techniques. For example, it may be more cost effective to eliminate the bias facing on the cone skirt and simply have the lining attached at the waist.

The shell jacket is an example of a garment that may not be put into mass production. It is a very labour intensive garment and lacks practicality, therefore, it could be a one-of-a-kind wearable-art piece. The shell in the line of garments could be replaced with a

garment, such as a sweater, that might have greater mass market appeal. The design of the sweater could be similar to the shape of shell, but may not be as long and could include a high collar instead of a hood. The bandeau top may have mass market appeal if it was made longer, like a tank top, and cut to incorporate more stretch for greater comfort.

To reach a larger market, the line of garments should be offered in additional colour choices. The garments could also be effective in a line of fabrics depicting other metal-like surfaces, in colours of navy, purple, gold or rust. It would be important to ensure that similar metallic-like fabrics are available in these colours to maintain the theme.

Recommendations for further study

The investigation and exploration of the creative design process is on-going. This study will inform and influence all my subsequent designs and has given me greater awareness of the ways in which I create. Although I have answered many of the questions I wished to address, new questions and potential for inquiry have arisen from this process. I have only initiated my involvement in the development of a creative design process model and its evolution will be continuous. This study illustrated the development and documentation of the creative apparel design process for one person and from that, a proposed model of the process was developed.

The proposed model differs from previous apparel design models because it combines the thinking and action elements involved in the development of a creative product. Models such as the engineering design process theory (Regan, Kincade & Sheldon, 1998) and the apparel design process model (Lamb & Kallal, 1992) only acknowledge the steps of the process once the initial idea for a product has been determined, commonly referred to as identification of the problem. Furthermore, the creative apparel design process model presented the thinker/designer as the focal point, acknowledging the importance of the designer's control over the whole process (Dorst & Dijkhuis, 1995). By presenting the thinker/designer as motivator for the process and by acknowledging that their experiential knowledge will be used as a basis of decision making, the model becomes more generalizable to all thinker/designers.

Presenting the creative apparel design process as a dynamic, three-dimensional and unique experience is an effective way to illustrate that there is not a set way to design. The proposed model would be an empowering tool for use in a classroom setting. Lamb and Kallal (1992) stress the importance of conceptual frameworks for students to learn

about creative thinking and problem solving for design and other life applications. By integrating creative thinking process models, from psychology, and apparel design process models, from the field of clothing and textiles, the creative apparel design process model would augment a student's multi-disciplinary educational base (Lamb & Kallal, 1992). More importantly, the presentation of this model to a classroom setting may awaken students to their personal paradigms and challenge them to unleash their creative potential. This viewpoint is summarized by Udall (1996) in his statement: "The design brief [process] can be harnessed as a provocative tool to promote dialogue between creator and created, between self and other" (p. 45).

The proposed model for the creative apparel design process has great potential for further theoretical development and educational use. However, this model has not undergone extensive testing. The most appropriate way to test the creative apparel design model would be to introduce it to other thinkers/designers who would use it, such as students and professionals and then have them document their design process. As the model illustrates non-quantifiable elements, a quantifiable testing method would be inappropriate. The presentation of the model to the classroom and design studio would introduce theoretical concepts of creative thinking and apparel design models, while directly involving the thinker/designer in their own creative apparel design processes. Questions that could be addressed by further investigation include: "Does an awareness of one's design process aid the process?" and " Is the creative apparel design model applicable to other forms of design?" During the initial stages of research my interests were determined by factors that influence the process of creative apparel design. However, upon completion I have a new intrigue, I am now fascinated by abstract concepts, their application to and expression of the creative apparel design process.

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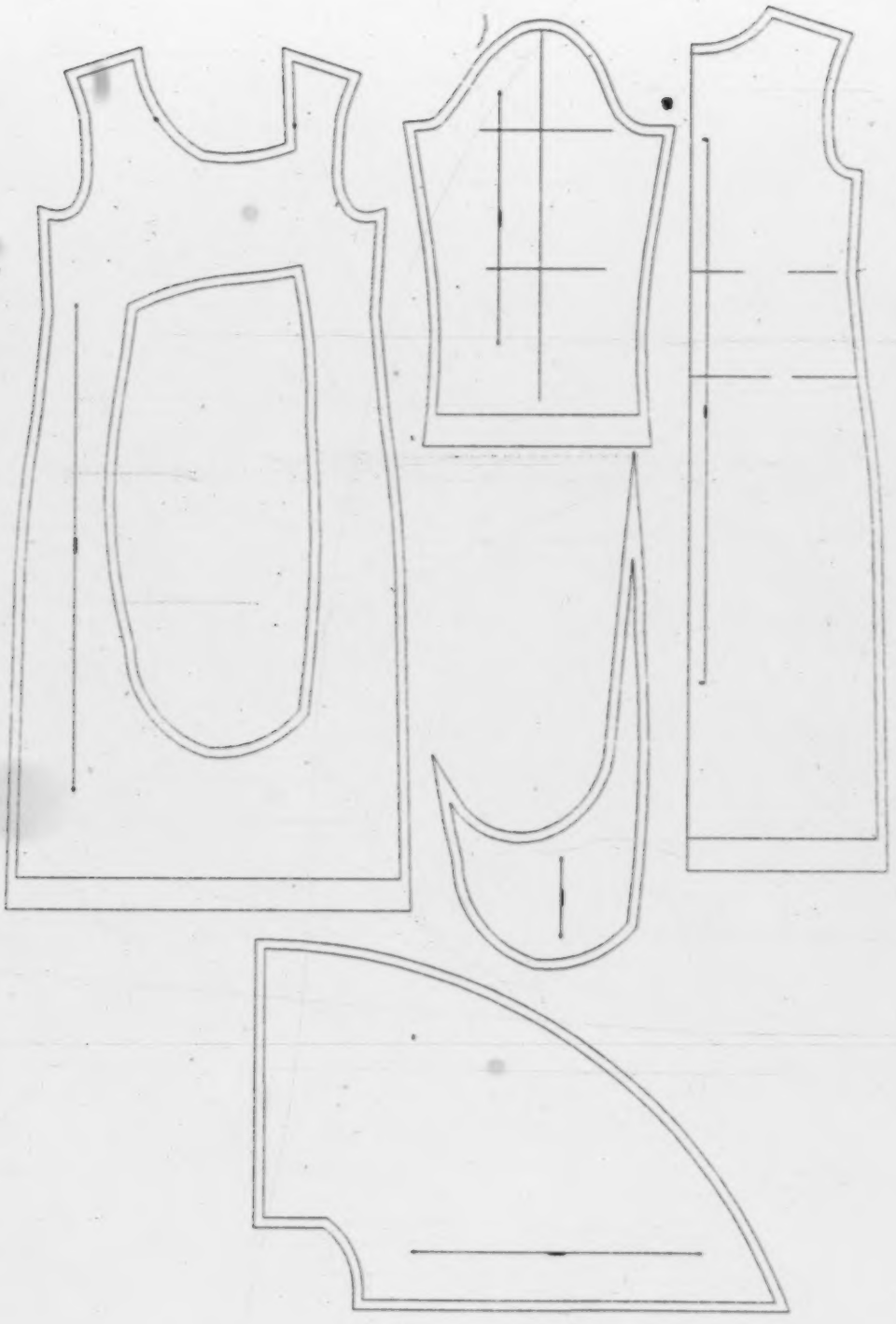
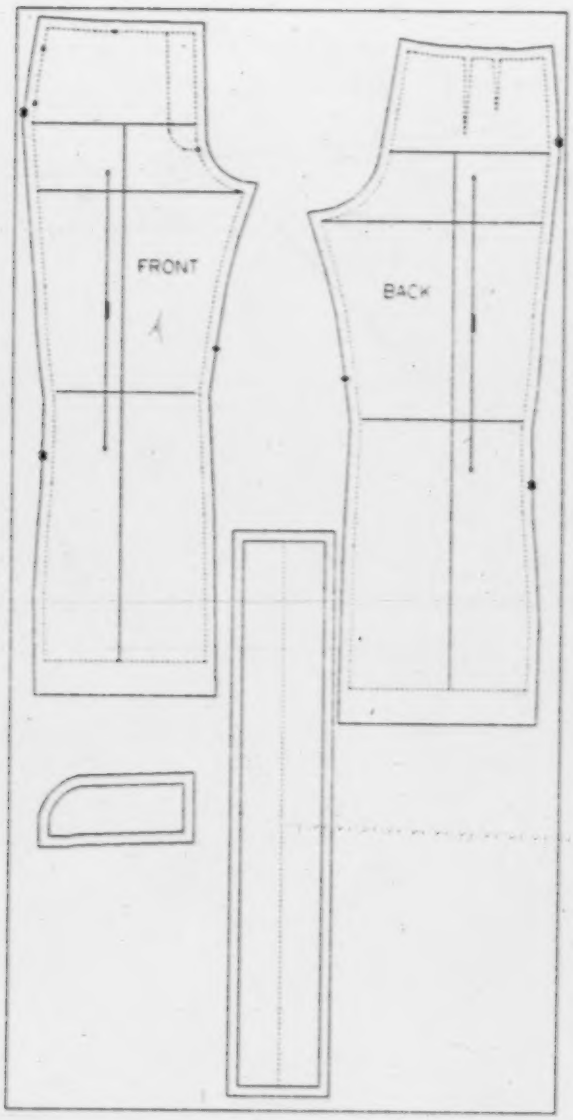
Appendix A:

The following illustrations are one-tenth scale pattern pieces of the garments that were drafted using the AutoCAD® and PCPattern® computer software.

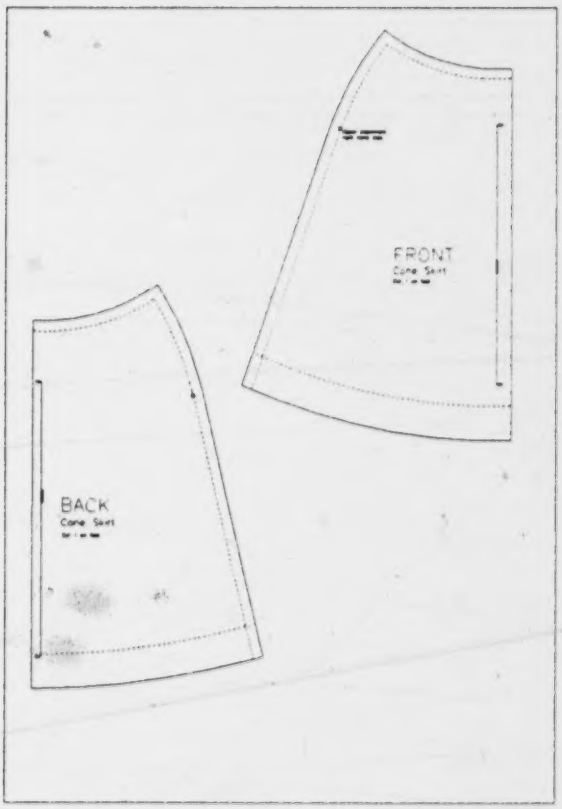
The shell



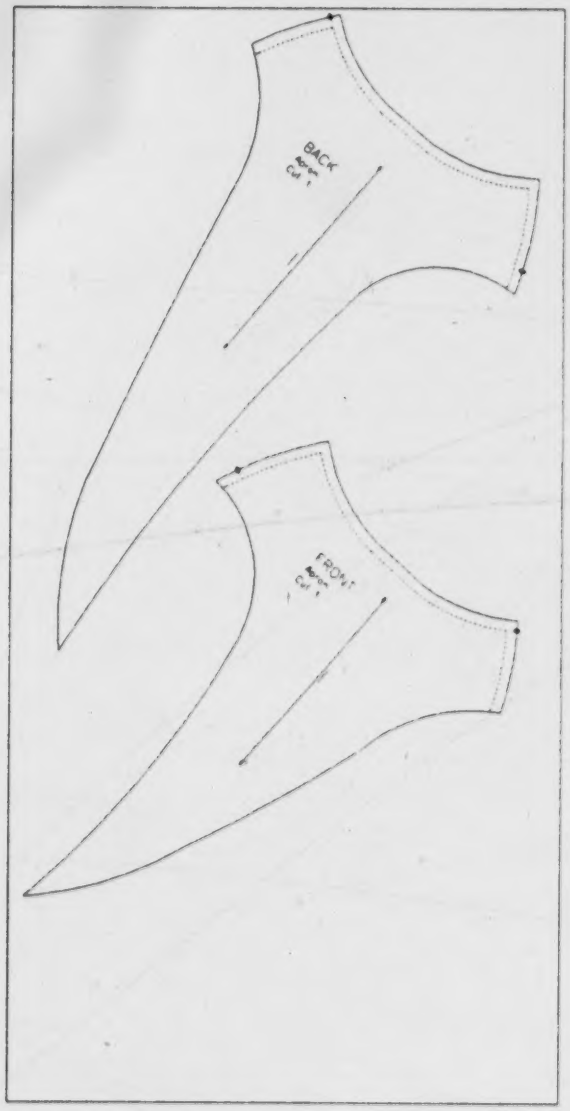
The wide leg pants



The cone skirt



The apron



The roll-collar jacket